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CATALOGUE

OF THE

NATURAL HISTORY DRAWINGS

COMMISSIONED BY

JOSEPH BANKS

ON THE

ENDEAVOUR VOYAGE 1768—1771

HELD IN THE BRITISH MUSEUM (NATURAL HISTORY)

PART 3: ZOOLOGY

Alwyne Wheeler

Bulletin of the British Museum (Natural History)
Historical Series Volume 13 (Complete)
London 1986

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INTRODUCTION

This catalogue lists all the drawings of animals from James Cook's voyage on the *Endeavour* from 1768–1771 which were made by artists employed by Joseph Banks. Most of the drawings are the work of Sydney Parkinson (?1745–1771), but there are others by Alexander Buchan (?– 1769) and Herman Diedrich Spöring (?1733–1771).

The drawings were the property of Joseph Banks (1743–1820) and were kept in his London home in New Burlington Street from 1771–1777 and at 32 Soho Square from the summer of 1777 until his death in 1820. Under the terms of his will Banks's drawings, manuscripts, library, and collections were left to his curator–librarian Robert Brown (1773–1858) for life, with reversion to the Trustees of the British Museum on Brown's death, unless Brown and the Trustees had previously agreed to their transfer. The Trustees and Brown reached such an agreement and in 1827 the collections were transferred to the British Museum and Brown became Under Librarian for the Custody of the Banksian Collection.[1]

The Banksian Collection manuscripts and drawings were kept as a unit but the collection of books was placed in the Printed Book Department of the Museum. The zoological manuscripts of Daniel Solander and the drawings of animals were thus kept with the Banksian Collection of Plants. As late as August 1842 J.E. Gray, then Keeper of the Zoological Branch of the Natural History Department since 1840, referred to the animal drawings and manuscripts in the Banksian Collection of Plants (Gray, 1843*a*).

The manuscripts and drawings and those Banksian natural history books with annotations were transferred to the new building of the British Museum (Natural History) at South Kensington in 1880–1881. It is presumed that during this period the zoological manuscripts and drawings were separated from their botanical counterparts and became the responsibility of the Department of Zoology. Certainly the third volume of drawings was transferred from the Botanical Library to the Zoological Library on 8 March 1887 which suggests that the first two volumes were already in the latter library then.

The principal purpose of this catalogue is to record comprehensively the surviving animal drawings from the voyage of the *Endeavour*. However, the opportunity is taken to examine and discuss the history of the drawings, their arrangement and binding as well as giving short notes on the artists, none of whom survived the voyage. In addition, it has seemed relevant to discuss the manuscripts associated with the animal drawings, in particular Jonas Dryander's *Catalogue of the drawings of animals in the library of Sir Joseph Banks* and Daniel Solander's manuscripts relating to the voyage. A short discussion of the dispersal of the collection of animal specimens from the *Endeavour* voyage is preceded by some notes on the significance of the drawings to modern zoology.

General details of the voyage of the *Endeavour* are not given. These have been recounted many times, and are available in the introduction to a companion volume to the present paper in this journal (Diment *et al.*, 1984) where an extensive bibliography of the voyage, its principal participants, and its natural history are presented.

[1] British Museum, Trustees' Minutes 30 June 1827.

THE *ENDEAVOUR* ANIMAL DRAWINGS

The animal drawings are the work of three artists, Sydney Parkinson, Alexander Buchan, and Herman Diedrich Spöring. They are contained in three bound volumes; the binding believed to date from 1934. The drawings are mostly inlaid into larger sheets of 360 × 527 mm, but some are bound in directly on their original sheets (where these approximate, or exceed, the size of the volume). Because he used large paper for his drawings, these outsize sheets are mostly the work of Spöring. Several of these large drawings have been badly cropped by the binder. The drawings number 299 in total.

The drawings are currently (1985) in process of conservation and will be mounted as separate plates.

The artists have been studied in some depth by the late Averil Lysaght (1959, 1977, 1980) and brief notes derived from her later papers are given so that the contribution of each can be assessed more clearly.

Sydney Parkinson (?1745–1771), born in Edinburgh, was the son of Joel Parkinson, a brewer and a Quaker. He may have been trained as a draughtsman by William De la Cour, a Frenchman who established a School of Design in Edinburgh in 1760. Parkinson travelled to London in 1764 or 1765 and worked with James Lee, a nurseryman at Hammersmith, who engaged him to give drawing tuition to his daughter Ann. Within two years Parkinson was working for Joseph Banks drawing specimens, many of which were spirit preserved or stuffed skins, from Banks's earlier expedition to Newfoundland and Labrador in 1766 (Lysaght, 1971), and also numerous insects, chiefly Coleoptera and Lepidoptera, of tropical origin presumably in Banks's collection although possibly British Museum specimens. These drawings are still retained in the British Museum, Bloomsbury. Parkinson also copied some of the drawings prepared for Gideon Loten, a former Governor of Ceylon for the Dutch East India Company, and later resident in London. Some of these copies of drawings of Asiatic animals are preserved as a collection in the British Museum (Natural History); several were published by Pennant (1769) in his *Indian Zoology*. Recently, Parkinson has been the subject of a book edited by D.J. Carr, in which many of his zoological and botanical drawings from all sources are reproduced in colour, the zoological drawings being discussed there by Wheeler (1983). Parkinson died on 27 January 1771 when the *Endeavour* was homeward bound between Princes Island, West Java, and the Cape of Good Hope. Parkinson drew 268 of the drawings in the zoological collection.

Alexander Buchan (?–1769), was probably a member of the Berwickshire family. Little is known of his life despite considerable enquiry by Averil Lysaght. He joined Banks's team especially as a landscape artist and most of his work in this field is still preserved in the Department of Manuscripts at the British Library. However, he produced a number of water-colour drawings of animals on the first leg of the voyage, at Madeira and off Brazil. On Tierra del Fuego when Banks led his party on an expedition into the hills on 16 January 1769 Buchan suffered an epileptic fit from which he only partly recovered. He died on 17 April 1769 at Tahiti. Lysaght (1979) commented on the small quantity of his work after the *Endeavour* rounded Cape Horn, and also quoted Cook's journal recording his death in which Cook wrote 'he had long been subject to a disorder in his Bowels which are more than once brought him to the Very point of death and was at the same time subject to fits of one of which he was taken on Saturday morning, this brought on his former disorder which put a period to his life.' From this it is obvious that Buchan's health was precarious after the onset of his epilepsy at Tierra del Fuego, and the virtual absence of his drawings between Cape Horn and Tahiti needs no explanation. Besides which, this part of the voyage was across open sea,

which certainly held no landscapes and from which limited zoological, and no botanical, material was available for drawing.

There are 21 drawings by Alexander Buchan in the three volumes of animal drawings (ff.120, 122, 135, 137, 171, 175–176, 192, 211–214, 216, 218, 221, 238, 291, 294–297). Thirteen of these are of invertebrates, the remainder of fishes. All were drawn at Madeira or off the coast of Brazil.

It is of interest to note that Dryander's *Catalogue of the drawings of animals in Banks's collection* lists a total of 32 Buchan drawings mostly of insects from localities (Madeira, Brazil, or Atlantic Ocean) visited by the *Endeavour*. In addition, a Buchan drawing of the starfish, Asterias tessellata Solander mss, from Rio de Janeiro is deleted in the list in pencil and Dryander has written 'destroyed' in the last column of the *Catalogue*. Two other drawings attributed to Buchan of the cockroach, *Blatta Germanica* L., have as their origin 'in nave', which having regard to the context (and the well-known affinity of cockroaches for ships) can only have been caught and drawn on the *Endeavour*. Therefore there were at the time of the compilation of Dryander's *Catalogue* a total of 35 Buchan drawings; this leaves 13 unaccounted for today.

Herman Diedrich Spöring (*ca* 1733–1771) was born in Åbo, then Swedish territory, now Turku in Finland, where his father was professor of medicine at the university. Educated at Åbo he left Sweden in 1755 and came to London where for eleven years he earned his living as a watchmaker. In 1766 he was employed as a clerk by Daniel Solander, then Assistant Keeper of the Natural History Department of the British Museum. His handwriting has been identified by Marshall (1978) in many of Solander's manuscripts in both botany and zoology. His role on the *Endeavour* voyage was that of amanuensis, transcribing the notes made by Solander and Banks as a fair copy, many of which survive for the botanical manuscripts. He also proved invaluable in repairing the ship's quadrant after it had been stolen by the natives on Tahiti. However, like Buchan and Parkinson, he was a versatile artist and numerous landscapes and ethnographic drawings in New Zealand and Tahiti were made by him. He was a highly competent zoological illustrator, working in pencil, and his drawings of rays, sharks, a bony fish, and crustaceans were not excelled in the zoological material.

His contribution to the illustrations of the *Endeavour* voyage had been largely overlooked until, with Averil Lysaght in the early 1950s, I recognized Spöring's name on one of his fish drawings, from whence it became simple to recognize his characteristic pencil drawings elsewhere. Lysaght (1979) recounts how she then rediscovered the 80 or so Spöring topographic and ethnographic drawings in several collections in the British Museum, all until then attributed to either Parkinson or Buchan.

Together with many of the crew of the *Endeavour*, and Banks's scientific team, Spöring contracted malaria and dysentery during the visit to Batavia. He died on 25 January 1771, two days before Sydney Parkinson, soon after leaving Princes Island, West Java, on the homeward-bound voyage.

There are a total of 9 drawings of animals by Spöring in the collection (ff.49, 50–52, 59–60, 99, 219–220). Dryander's *Catalogue* lists 9 Spöring drawings only; evidently none have been separated from the collection. Six of these are rays (including two of the sting-rays which gave their name to Stingrays Bay, later changed to Botany Bay), and sharks, one bony fish (f.99), and two crabs (f.219–220). The emphasis on large fishes might suggest that Spöring was especially capable of drawing large specimens (and indeed his renderings are more life-like and accurate than drawings of comparable subjects by either of the other artists) but his studies of crabs are so excellently executed that it is obvious that he was capable

of producing accurate reproductions of small animals as well. Probably the explanation for his work on the rays and sharks was that Parkinson was simply overwhelmed by the quantity of botanical drawing required at this rich collecting ground, which caused the name change to Botany Bay, and Spöring was required to draw these impressive and unknown fishes before they were eaten or decayed.

The *Endeavour* animal drawings are arranged broadly in the order of the twelfth edition of Linnaeus's *Systema Naturae* (1766–1767). The names used in the arrangement are Solander's manuscript names which are written usually on the verso, sometimes on the recto, of each sheet. As Solander was very often employing Linnaean genera with their very broad concepts (often equivalent to families of fishes in modern ichthyology) the arrangement may at times appear to be quite arbitrary, although it was logical enough in the contemporary context. Problems occurred when Solander had introduced a new generic name, such as Nasutus in fishes, whose affinities he had not recognized, and which was merely bound in at the end of the volume containing bony fishes.

Another problem caused by the reliance on the *Systema Naturae* for arrangement was that the elasmobranchs (sharks and rays) and tetraodontiform fishes (trigger-fishes and puffer-fishes) formed the group Nantes of the Amphibia of Linnaeus (1766). As a result they are bound in volume 1 with the mammals, birds, and chelonians (Mammalia, Aves, Amphibia) to the surprise of some authors (e.g. Palmer, 1966, who apparently was confused by this).

All the drawings are annotated to some extent. Many bear short verbal accounts of coloration, or corrections to existing colour on the drawing. These are in the hand of Banks or Parkinson. Most of the drawings are named by Solander and the names are numbered in some way. It is evident that some listing of the drawings was undertaken probably as they were finished but it is difficult now to establish under what system the numbers were employed. The 5 land birds from Tahiti were numbered 1, 2, 3, 4, and 40 (ff.36, 34, 9, 35, and 8 respectively); Brazilian fishes are numbered 5, 7, 13, 14, 15, and 15 (ff.94, 122, 139, 135, 75, and 92 respectively) but it is difficult to see the logic behind these sequences. One probability is that the artists, either singly or collectively, were numbering their drawings in sequence, presumably keeping a master-list or lists, and for this reason there are extensive gaps in sequences (as in the Tahitian land birds). However, this does not account for the duplication in the Brazilian fishes. Most of the Madeiran animal drawings are numbered with the letter prefix T (it can sometimes be read as I), but again it proves difficult to reconstruct a logical sequence from the animal drawings alone. However, the use of a capital letter prefix to represent a geographical region is paralleled in Solander's method of note keeping (Wheeler, 1983) where notes on the fishes and the specimens were numbered serially with the prefix A from the Pacific Ocean, and B from New Zealand. Possibly a similar system was in use for the drawings but the notes, specimen numbers, and the drawing numbers are independent of one another and are not cross-referred.

The drawings are also labelled with the artist's name and in many cases the locality, both written in ink by Jonas Dryander. It seems most probable that Dryander wrote these annotations of artist during the period that he was compiling his *Catalogue of drawings of animals* (see below, p. 10) which dates them to the period 1772–1776.

It is probable that the present (1984) sequence of binding the drawings was adopted in Dryander's time. Indeed, it is logical to assume that Dryander, as Banks's librarian, would in a series of operations identify the artist for each drawing and the place at which it was made, both for his draft *Catalogue* and in order to label the drawings, and would then arrange the drawings in sequence, numbering them while doing so. As already noted, the sequence

follows the twelfth edition of the *Systema Naturae* (1766–1767), although hitherto unrecognized genera (e.g. Nasutus, see above) or unidentified drawings were simply bound in at the end of the appropriate section. In the case of the fish genera involved, an attempt to place them in the correct systematic series was made in the final draft of Dryander's *Catalogue*, however, and this implies that the folio numbering, and thus sequence for binding, was earlier, perhaps pre-1772. (The numerals of the folios are written in pencil in large figures, but are not apparently in the hand of either Dryander or Solander.) There are other pencil numbers not part of the present sequence on some drawings. These may represent an earlier sequence but it is difficult to establish which it is as only a few drawings are so numbered. The main sequence of folio numbers was cited by authors as early as Heinreich Kuhl (1820), which shows that their use was firmly established before Banks's death.

There are two unsolved puzzles about the animal drawings from the *Endeavour* voyage. Firstly, they are not listed in Dryander's *Catalogus Bibliothecae historico-naturalis Josephi Banks* (Dryander, 1796:17), even though the Forster, Ellis, and Webber drawings were listed. Secondly, in his short history of the libraries in the British Museum (Natural History) Woodward (1904) listed, under Parkinson, within his list of Banks's library, the 'Original water-colour drawings of Plants and Animals made during Capt. J. Cook's first voyage . . .' eighteen botanical and one zoological volume. This was corrected by Sawyer (1971) in an otherwise identical entry to eighteen volumes of botanical and three of zoological drawings. Sawyer's list is clearly correct but why Woodward should have listed only one volume in 1904 remains a mystery; presumably it was a cataloguing omission arising from the recent transference of the present third volume from the Botanical Library to the Zoological Library (which took place on 8 March 1887). Possibly the first two volumes had not previously been catalogued but the recent transfer had been noted.

Few of the animal drawings by Sydney Parkinson are finished artwork, and some are merely pencil outlines often with notes on coloration which were to be finished later. The drawings by Spöring are detailed studies in pencil and are clearly finished drawings for record purposes. There seems to have been no intention to finish them in colour. Buchan's drawings are all finished water-colours. The unevenness in completion of the animal drawings has been touched on by Carter *et al.* (1981) who drew some general conclusions.

The presence of Buchan drawings of invertebrates and fishes from the first stages of the voyage can be interpreted that the experienced animal draughtsman Parkinson was advising or helping Buchan gain experience in this field, an artistic area far removed from the landscape studies he was engaged to practise. In addition, the approaches to Madeira were well-known to European sailors, and views of them would have been made by many earlier draughtsmen, so Buchan may also have taken the opportunity to draw animals as there was little other artistic employment for him. In the approaches to Rio de Janeiro he made a number of landscape drawings, even though this harbour was as well-known as Madeira, and there are others in the general area of Tierra del Fuego, but very few from the Pacific Ocean (Lysaght, 1980). Buchan's ill-health, and death at Tahiti, prevented him from making any considerable contribution to the artistic record of the voyage. His death moreover forced on Parkinson and Spöring a considerable burden of landscape drawing, a form which had not been designated as their first responsibility.

The animal drawings show most notably an emphasis on marine subjects, with a considerable number of oceanic, planktonic, or nektonic animals featured. This must be a result, not directly of the abundance of marine life, but to a lack of plant subjects while at sea,

for Banks's interest in plants was greater than his interest in zoology. Nevertheless, the naturalists made critical and original observations on the nektonic animals such as crustaceans and their larvae, and plankton such as *Physalia physalis*. However, at landfalls Banks and Solander collected so many plants which they required Parkinson to draw that in many cases only single leaves, flowers, buds, or fruits were coloured on a drawing so as to give guidance for the completion of the finished drawing. Most of the animal drawings made in the Pacific Ocean were made near to or at landfalls, especially Tahiti, Australia, and New Zealand. A similar policy was adopted for these as for the botanical drawings, some colour being painted in, and colour notes made, but very few were ever finished. In Australia and New Zealand Spöring made most of his exact pencil drawings of animals, presumably while Parkinson was fully occupied with botanical drawing.

After the *Endeavour* returned to England it was Banks's decision to concentrate on the plans to publish the plant drawings. Many were redrawn by other artists and were later engraved on copper (Diment *et al.*, 1984) but the proposed grandiose publication was never achieved. By contrast the animal drawings were neglected, no attempt was made to produce finished or fully coloured artwork, and it seems that publication, although presumably envisaged as taking place after the plant volumes were published, never was a viable project.

As Carter *et al.* (1981) have already pointed out there was also a system of priority in the types of animals drawn. Fishes dominate the artistic record, birds, and marine invertebrates are also numerous, but mollusc shells and arthropods, such as insects, are scarcely represented. The choice of animal for drawing clearly depended on the likelihood of the preservation of its coloration and body form. The colours of fishes are highly fugitive, and after preservation in barrels of spirits of wine or rum (as they were on the *Endeavour*) would not have been discernable. Banks was already aware of drawings made from alcohol-preserved fishes after his Newfoundland and Labrador voyage, and even though Parkinson's drawings of them are accurate they are obviously made from dead fish, and they were not coloured. On his North American voyage Banks also had shot birds which were later stuffed and then drawn by Parkinson and Peter Paillou with only moderate success in the final presentation. The bias in the drawings towards soft-bodied and impermanently coloured animals such as coelenterates, salps, siphonophores, fishes, and birds, was thus a response to the naturalists' inability to preserve their colour and body form. The many molluscs, insects, and other arthropods which they are known to have collected were not drawn in any numbers, because they would have been prepared as dry specimens which would retain both their form and colour.

The bias in the animal drawing towards marine subjects can thus be seen as the result of conscious policy decision by Banks. The paucity of land animals represented in drawings and manuscripts is not because they have been lost or given away, as some authors have suggested, but is the obverse of the concentration on botanical studies while at the landfalls, and on animals only when plants were unobtainable.

DRYANDER'S CATALOGUE

Dryander's manuscript *Catalogue of the drawings of animals in the library of Sir Joseph Banks* is bound (rebound in 1947–1948) in half leather and comprises 251 numbered leaves, with 3 + 8 unnumbered original leaves at front and back; size 325 × 203 mm. A later entry on the title page reads 'J. Dryander's manuscript catalogue of the drawings of Animals in the

Library of Sir J. Banks arranged in systematic order'. The paper is watermarked C. Taylor, with a countermark of Britannia in an oval surround with a crown; it is not dated. Each leaf is ruled on both sides in reddish-brown ink, once horizontally near the head of the page, and with four vertical lines, from the horizontal line downwards, to give five unequal columns. These columns are used to give an indication of the medium of the drawing (see below), the scientific name of the animal, the locality or source of the specimen, and the artist concerned (Figure 1). The last column is usually left blank.

It represents a catalogue of all the animal drawings in Banks's collection arranged systematically under major group names, as current in the late eighteenth century, with each drawing listed under the genus name. Many drawings are identified by binominal name, with abbreviation of the name of the author of the binomen, and notes on the sex of the specimen in some cases. Most drawings have a locality of origin of the animal, or some other note, and all are attributed to various artists. Whitehead (1978) has listed these artists by name, in some cases identifying them with initials: the following list is reproduced from Whitehead with some modification, the most frequently used form of the name being in parentheses where this differs from the main entry: P. d'Auvergne (D'Auvergne); J. Backström (Backstroem); Barnes; Bolson; P. Brown; A. Buchan; J. Cleveley; N. Dance (Nath. Dance); T. Davies; G. Edwards; W. Ellis (William Ellis); Engleheart; G. Forster (Ge Forster); F. Frankland; S. Gilpin; J. Greenwood; W. King (Wilhelmina King); G. Metz (Gertrud Metz); J. Miller (Jas. Miller); J.F. Miller; U. Mole (Utrick Mole); F.P. Nodder; P. Paillou (Paillou); S. Parkinson; Chevalier Pinto; Roberts; J. van Rymsdyk; A. Schouman; J.E. de Sève (Seve); J. Sowerby; H. Spöring (Spôring); J. Stuart; G. Stubbs; W. Watson (Dr. Watson); J. Webber; R. Wright.

Dryander adopted several shorthand symbols to abbreviate the information in the list. His first column details the medium employed for the drawing; Viz. × = 'Finished in Colors,' + = '[Finished] without Color', / = 'Sketch with Colors', − = [Sketch] without Colors, o = 'Copy upon transparent paper'. The third column in his catalogue is mainly a listing of the locality from which the subject came, but some other data are included. The localities are mostly abbreviations or contractions of an area name, but the nomenclature was, of course, eighteenth century usage. The localities are listed below; the abbreviation is copied exactly. Modern equivalents are given where needed.

Seven other abbreviations not referring directly to geographical locality or medium for the drawing were also adopted: a.v. Animal vivum (live animal); L.Y.A.M. Lady Anne Monson; O. Beng Original drawn at Bengal; Pen: Pennant (Thomas Pennant, 1726–1798, naturalist, author and correspondent of Banks); P.F. Pellis Farcta (stuffed skin); P. sal. Piscis salitus (fish preserved with salt); and s from an animal in spirit.

The list of localities and other abbreviations and symbols was evidently not compiled all at one time, for the writing differs (although all is by Dryander). Some of the entries are heavily inked, others are lightly inked, and there are two insertions into the alphabetical sequence. Looked at overall it is exactly the kind of list which would result from the first draft of a working catalogue. The main body of the catalogue, in which the drawings are listed, is very different. The writing is neat and consistent throughout the page and from page to page (with very few exceptions), the headings for class and order are always written centrally at the head of the page, the genus name is written in capitals at the head of the second column, and the entries for the drawings follow the same pattern exactly, except where information is lacking. Considered beside the introductory sheet of abbreviations the main listing is so consistent that it must represent a fair copy by Dryander from an earlier working list. The

Pisces

Thoracici

CHAETODON

/	C. cornutus L.	Soc. Isl.	J. Parkinson
/	C. lineatus L.	Soc. Isl.	J. Parkinson
/	C. macrolepidotus L.	Soc. Isl.	J. Parkinson
/	C. saxatilis L.	Soc. Isl.	J. Parkinson
+	C. peregrinus Bl.	Amal.	J. P. Miller
×	C. incisor Bl.	Mas.	J. Parkinson
×	C. Rigao Bl.	Mas.	J. Parkinson
×	C. cyprinaceus Bl.	Oc.	J. Parkinson
×	C. longirostris Brouss.	Sa. Isl.	W. Ellis
×	C. triostegus Brouss.	Sa. Isl.	W. Ellis
/	C. stellatus Brouss.	Hero. I.	W. Ellis
/	———	Soc. Isl.	G. Forster
/	C. glaucoparaeus Brouss.	Soc. Isl.	J. Parkinson
/	———	———	G. Forster
/	C. Meleagris Brouss.	S. Isl.	G. Forster
—	C. unicornis Brouss.	Soc. Isl.	J. Parkinson
/	———	———	G. Forster
×	———	Sa. Isl.	J. Webber
/	C. unicornis var. Brouss.	Soc. Isl.	J. Parkinson

Am. oc.	Americes littus occident (western coast of America)
Ascens	Island of Ascension
Bat:	Batavia India orientalis
Bras:	Brasilia
C.b.sp.	Caput bonae spei (Cape of Good Hope)
Chr. Isl.	Christmas Island
Fr. Isl:	Friendly Islands
Herv. I.	Hervey's Island
I.D.R.	Insula Diego Rays, Ind:or:
Kamt.	Kamtschatka
Kergu.	Kergulen's Land
M. Spitz	Mare prope Spitzbergen
M. pac:	Mare pacificum (Pacific Ocean)
M.P.B.	Mare pacificum boreali (northern Pacific Ocean)
Mad.	Madeira
Marque.	Marquesas
N. Cal.	Nova Caledonia
N.C.	Nova Cambria (New South Wales, Australia)
N.Z.	Nova Zelandia
Norf. I.	Norfolk Island
Ot.	Otaheite (Tahiti)
Oc.	Oceanus (open ocean)
Palm I.	Palmerston Island
Pr. Isl.	Princes Island, Ind.[ia]
Pul: Con:	or.[ientalis]
Rio Jan.	Pulo Condor Ind. or.
Sa. Isl.	Rio Janeiro
Soc. Isl.	Sandwich Islands
S. Geo.	(Hawaian Islands)
Spizb.	Society Islands
St. L.	South Georgia
Sur.	Spizbergen
T. d. F.	Staten Land
Turtle I.	Surinam
Unal.	Terra del Fuego
	Turtle Island
	Unalashka

few exceptions where the handwriting is not consistent are clearly later insertions which the format adopted, with ample space between entries and one genus and another, was clearly designed to permit. Examples occur on f. 143 *Pleuronectes* Whiff Flounder . . . Dr Watson, and f. 17 *Mus* . . . N. America Col. Davies.

The date of compilation of the catalogue is difficult to establish but there are several indications of dating. Logically, a catalogue of Banks's collection of animal drawings might have been expected to be contemporaneous with Dryander's *Catalogus Bibliothecae* . . . (1796–1800). This great catalogue in four volumes included the drawings of animals from Cook's second and third voyages (vol. 2, p. 17) by George Forster, William Webber, and William Ellis, giving the number of folios in each case. In the case of the Forster collection, Dryander listed it as in two volumes totalling 261 folios, which agrees exactly with the present foliation in the two volumes (as some folios have two drawings mounted there are a

Fig. 1 Jones Dryander's manuscript *Catalogue of the drawings of animals in the library of Sir Joseph Banks* f. 145. The columns contain an indication of the medium of the drawing (see text for details), the scientific name of the animal represented, the locality or source of the specimen, and the artist. Note the number of *Chaetodon* species attributed to P. M. A. Broussonet, many are manuscript names which he communicated to J. F. Gmelin (1789).

total of 271 drawings). This demonstrates that this collection had been sorted, foliated, and one presumes mounted on sheets in some cases, before the production of Dryander's second volume (1796). The preparation of a catalogue of the drawings might therefore have been accomplished at the same time as the foliation, and certainly after it, and this catalogue might be dated to the late 1780s.

Although the omission has no bearing on the discussion of the date of preparation of Dryander's manuscript *Catalogue*, it must parenthetically be noted that the printed catalogue (Dryander, 1796–1800) does not list the original drawings of animals or plants from the *Endeavour* voyage, although the collected drawings from the second and third voyages are listed. It seems to be an inexplicable omission.

Jonas Dryander (1748–1810) became Banks's librarian after the death of Daniel Solander in 1782. The dates of his working for Banks thus provide a narrowed period of time for the compilation of the catalogue of drawings.

Within the catalogue there is some evidence for dating from the scientific nomenclature used. Thus, on f.65 the genus *Aptenodytes* is entered in the normal manner and this name was published by Forster (1781*a*). On f.43 and f.75 the bird genera *Callacas* and *Chionis* are both entered in pencil, although the entries for the appropriate drawings are given in the normal manner in ink. These generic names were published by Forster (1788). On f.175 two entries under the genus *Clupea* refer to P.M.A. Broussonet's *Ichthyologia*, which was published in 1782. Both species are entered in ink in the normal manner and are contemporaneous with the major part of the catalogue. From internal evidence of the nomenclature used it seems that the main catalogue was compiled after 1781–1782 and before 1788.

Confirmation of the earlier date can be found in the reference on f.11 to Forster's description of *Felis capensis* (Forster, 1781*b*), the entry written contemporary with the main catalogue. Many names attributed to Broussonet particularly within the genera *Chaetodon* (ff.145–147), *Sciaena* (ff.155–157), and the manuscript name Meandrites (f.157) are often written in pencil (the *Chaetodon* entries are in ink). These were names given to the fishes represented in the drawings, and often written on the drawing, by Broussonet. His published *Ichthyologia* (Broussonet, 1782) was sub-titled 'Decas I' but no further publication appeared under this title. These manuscript names, which must date from the period 1780–1782 or 1786, when he was in London and worked on Banks's collections, were presumably intended to be published in later decades of the work, and are thus treated somewhat tentatively by Dryander by entering some in pencil. Some of the *Chaetodon* names were published by Gmelin (1789) from a personal communication by Broussonet.

These varied indications for dating the Dryander manuscript give a broad range of the 1780s, narrowing down on single pieces of evidence to between 1782 and 1788. It therefore seems possible that Dryander compiled this catalogue around 1785.

The systematic arrangement of the catalogue basically follows the arrangement of Linnaeus's (1766–1767) twelfth edition of the *Systema Naturae*. There are, however, additions of genera which were not represented in the published work. With the case of the well-known, but wrongly-sited Kanguru, Dryander followed Solander's placement in Mammalia – Glires, he followed Solander for the new genus Nectris (between *Procellaria* and *Diomedea* in Aves-Anseres), and in both cases would have been influenced by the manuscript notes and even the sequence of binding. However, with new taxa from George Forster's drawings, Dryander, having no manuscripts for guidance, presumably had either

to follow the sequence of the binding or take decisions as to the correct order to adopt. It is interesting that the Dryander *Catalogue* in some places improves on the sequence of arrangement adopted in the drawings. In the *Endeavour* drawings collection the sequence of arrangement is also based on the twelfth edition of the *Systema Naturae*, but at the end of the volume containing fishes there are six drawings (ff.205–210) which are out of sequence. The reason for this is quickly evident; two of them (ff.209, 210) are unnamed, except for vernacular names, and the remainder represent genera which were novel and thus not placed in the system. These were Nasutus (Solander ms) – a synonym of *Gomphosus* Lacepède, and Dentex (Solander ms, non Cuvier) – the species of which are properly synonyms of *Saurida* Cuvier & Valenciennes and *Synodus* Scopoli. In Dryander's catalogue, however, these two genera had been placed in Pisces – Thoracici, after *Labrus*, and Pisces – Abdominales, after *Salmo*, thus correctly placing them in juxtaposition to their nearest relatives in the context of eighteenth century ichthyology. Possibly Dryander was sufficiently good an ichthyologist to have made these critical determinations, but this seems unlikely. It is surely more probable that Broussonet, well known for his studies on fishes, re-examined these new genera of Solander's, for which drawings, manuscript accounts, and in the case of Nasutus at least specimens (still preserved in the British Museum (Natural History)) were available, and correctly allied them with their relatives in the Linnaean system. Whether this was done during his visits in Solander's life-time (1780–1782) or on his later visit in 1786, after Solander's death, is not known. The latter seems more probable.

There are two final points about Dryander's catalogue. Firstly, the detailed listing by Dryander makes it possible to confirm that all the drawings listed in the mid-1780s are still present. This shows that in the class Insecta a considerable number of *Endeavour* drawings, especially those made by Alexander Buchan are no longer in the main collection. (These are discussed in more detail earlier, see p.7.) Secondly, most of the entries for the Cook voyage drawings are obliquely crossed through in pencil. In many cases it is a strong pencil stroke running through the set of entries, sometimes as many as twelve crossed through at once; in others one or two drawings specifically out of a set are scored through. This system of cancelling the entries looks crude, even careless, but is in practice most specific and exact. Its significance cannot be explained. It seems unlikely to have been done as a result of checking the individual drawings, as these were in four separate collections, for then an individual mark would have been more appropriate (indeed some, notably the Ellis bird drawings, are individually marked with a tick in possibly the same coarse pencil). Possibly a separate list of Cook voyages drawings was compiled from this catalogue, and the entries in the original were then cancelled. If this was so then the later list seems not to have survived.

SOLANDER'S ZOOLOGICAL MANUSCRIPTS

The surviving manuscripts of Daniel Solander in British collections have recently been catalogued by Diment & Wheeler (1984). Those that relate to the *Endeavour* voyage are discussed below in greater detail, but are referred to the Diment & Wheeler catalogue by the item numbers; these numbers (e.g. D. & W. 40c) are also used in the following catalogue of the animal drawings to indicate each manuscript, although in addition abbreviated titles (e.g. P.A.O.P.) are also quoted. The abbreviated titles are identified below.

ORIGINAL MANUSCRIPTS

Original descriptions of fishes and other animals obtained on Cook's First Voyage, with notes from the Iceland Voyage. 382 p.; 20 cm. (D. & W. 40)

This is a bound volume containing five manuscripts, the first four of which pertain to the *Endeavour* voyage. Each relates to a different geographical area and is compiled in the order of the acquisition of new specimens (or, at least, in the order in which they were described although the chronological sequence was ultimately fundamental). The manuscript is in the hand of Solander although indexes to two sections were made by Spöring. It is mostly written in ink but there are pencil notes and several smaller slips of paper are inserted although these are mostly vocabularies or rough notes of little direct relevance to the main manuscript.

This manuscript was held in the Botany Department of the Museum until 1875 when it was transferred to the Library of the Zoology Department.

Each section of the manuscript is foliated separately in a contemporary hand; the whole was recently (1980) paginated to include all slips and covers. These numbers are referred to as f. (= folios) and p. (= pages) respectively.

The four *Endeavour* manuscripts are:

Pisces Australiae 54 numbered folios, total pagination 1–76; (D. & W. 40a), referred to here as P.A. Australia in this context refers to New Zealand. Contains descriptions of 41 species of fishes, and one bird, *Pelecanus leucogaster* (p.59) on a tipped-in, pencil-written slip. An alphabetically arranged index to the manuscript, which also serves as a list of specimens preserved (69 fishes in total) and the serial number allotted to each species, occupies p.62–75.

Pisces &c. Novae Hollandiae 19 numbered folios, total pagination 77–106; (D. & W. 40b), referred to here as P.N.H. Contains descriptions of fishes (13 species), one bird, *Falco vidua* (p.79), and a crustacean, *Cancer lituratus* (p.88). The running head to the pages identifies the group entered on the page, as Pisces or Pisces & Insecta (Insecta Aptera for *Cancer*), and Amphibia (these last referring to the rays and sharks which were placed in Amphibia Nantes). There is no index to this section. Nova Hollandia (New Holland) was the name in use for Australia at the time of the voyage.

Pisces & Anim. caetera Oceani Pacifici 140 + 7 numbered folios (numerous unfoliated leaves); p.107–298 (D. & W. 40c) referred to here as P.A.O.P. This manuscript comprises several parts. Descriptions of animals from Tahiti occupy f.1–128 (p.113–248), from f.129–140 (p.249–260) fishes only are described 'got at the other Islands in the South Seas' (quoted from a note on the inside front cover), and separately foliated 1–7 (p.261–267) are descriptions of birds from Tahiti and Raiatea. An extensive index to the manuscript (p.285–292) lists the species as they are described, also giving the serial number of the specimen, the number of specimens preserved, the number of the 'cagg' (a small barrel) in which they are preserved; vernacular names are also given here as well as in the formal description for many of the fishes.

In this manuscript Tahiti was originally named George Land, or Otaheite and variant spellings. Most of the fishes described from 'other Islands in the South Seas' were captured at Ulhaietea (= Raiatea) p.249–254, but a tuna, identified as *Scomber thynnus*, Linnaeus, 1758 was described from Ohitirhoa (= 21°47′ 151°9′) on August 13, 1769 (p.255–259).

This manuscript is mostly concerned with fishes, but some birds are described, as noted above, namely *Ardea nigricans*, *Columba pectoralis* (p.261), *Hirundo fuliginosa*, *Anas fasciata* (p.262), *Ardea nivea*, *Cuculus otaheitensis* (p.263), *Pelecanus otaheitensis* (p.265), *Alcedo superhitiosa* (p.266), and *Sterna fuliginosa* from Ulhaietea (p.267). Animals other than fishes and birds are described within the body of the text on Tahiti as follows, *Lacerta soleata* (p.239), *Anguis platura* (p.221), *Asterias crasissima* (p.241), *Cancer escarlatinus* (p.198), *Cancer fasciatus* (p.188), *Cancer marmoratus* (p.197), and *Sepia octopodia* (p.159).

There are numerous sheets bearing pencil notes, some being descriptions of animals, others being words collected for vocabularies of the Tahitian language.

The entries on pp.255–259 have been deleted by means of vertical black and red lines running the length of the page. These pages were not transcribed into the fair copy of the manuscript (see D. & W. 41) but are present in C.S.D. (D. & W. 42), see below.

Animalia Javanensia & Capensia 30 numbered folios, total pagination 299–352; (D. & W. 40d) referred to here as A.J.C. This short manuscript is divided into two, *Animalia Javanensia* (p.301–304) and *Animalia Capensia* (p.307–330). There are several sheets of pencil notes, some of which may have no relevance to these sections of the manuscript, and p.345–347 are descriptions of birds (*Anas circia*, *Charadrius pluvialis*, and *Falco ossifragus*) some of which refer to the Iceland journey and are related to the fifth manuscript *Pisces Islandici*, which despite its title refers to mammals and birds in Iceland as well as fishes.

The first entry for this manuscript is dated 8 October 1770 and briefly described a bat *Vespertilio vampyrus* and a plover, *Charadrius pluvialis*, one of four shot on a small island close to Pulo Pari (5°52′S. 106°38′E) in the Agenieten group (Groves, 1962). Two other Javan animals are described, *Sciurus musarum* and *Cervus plicatus* (p.301), and there is a list (p.303) of vernacular names of animals from Princes Island (= Prinsen-eiland, off West Java) including mammals, birds, a turtle, and marine invertebrates.

The *Animalia Capensia* includes descriptions of nine birds, *Rallus cristatus*, *Diomedea demersa*, *Scolopax leucocephala*, *Anas leucops*, *Anas maculatus*, *Anas pilearis*, *Anas monstrosa*, *Ardea pelearis* (p.307–314), *Otis pavoninus*, *Vultur protheus* (p.322–325), and several mammals, *Capra torticornis*, *Capra migratorius*, *Capra spiricornis*, *Capra rupestris*, *Bos equinus/barbatus*, *Simia ursina* (p.315–322) and *Viverra suricatt* (p.327). By the inclusion of a reference to a drawing (Fig. Pict.) it is obvious that Banks had purchased drawings from a local source in South Africa; (Wheeler (1984*a*) suggested the Brants, who entertained Banks when the *Endeavour* was at the Cape). It is possible that some of the animals described were seen in captivity at the Cape.

There is a striking contrast between the highly organized and neat note making of the first part of the voyage and the rather disordered notes in this section of the manuscript when Solander and most of Banks's team were sick and Spöring and Parkinson dead, after their stay in Batavia.

Slip catalogue containing descriptions of animals in the British Museum and other collections, including species collected by Solander, some during Cook's first voyage 27 volumes. 4842 sheets. Mostly 10 × 16 cm but varies. Referred to here as S.C. (D. & W. 45)

This *Slip Catalogue* was originally kept as loose sheets in Solander boxes but the sheets are now bound in volumes.

The *Slip Catalogue* was described by Diment & Wheeler (1984) and was discussed by Wheeler (1984*a* & *b*) who concluded that it was essentially a loose-leaf filing system devised by Solander to keep his zoological notes in an adaptable and readily available form. Some of the notes date from the period before he left Sweden in 1760, others record his own collections in England, a few record descriptions of *Endeavour* specimens, while many record notes taken while cataloguing the collections of the British Museum, and private collections like those of Joseph Banks, Lady Anne Monson, the Duchess of Portland, and Lady Bute. The Mollusca volumes are rich in entries referring to the Portland collection.

Further detailed study of the *Slip Catalogue* would be a valuable exercise because it presents a partial survey of the holdings of these important collections and illustrates the standing of collections in London in the middle years of the eighteenth century, many of which were later dispersed and the specimens have disappeared or lost their identity. Wilkins (1955) made a brief analysis of the Mollusca volumes. For the present, however, only descriptions of animals which come from localities visited by the *Endeavour*, or for which there is other literary or artistic evidence of its origin on Cook's first voyage, are listed. These are given by volume, folio number, Solander's name (which is on many occasions unpublished), and notes of the locality.

MAMMALIA – f.9 *Simia satyrus* (Batavia, 13 December 1770), f.90 *Kanguru saliens* (New Holland), f.101 *Cervus axis* (Java).

AVES – f.23 *Psittacus* (New Holland, possibly not *Endeavour* specimen), f.126 *Anas antarctica* (Tierra del Fuego), f.151 *Diomedea exulans* (23 December 1768, 3 March 1769), f.157 *D. exulans* var. (3 February 1769), f.159 *D. exulans* var. (2 October 1769, 6 January 1770, 11 April 1770), f.160 *D. antarctica* (1 February 1769), f.162 *D. profusa* (3 February 1769, 15 February 1769), f.164 *D. impavida* (11 April 1770), f.168 *Pelecanus aquilus* (America meridionali), f.170 *P. antarcticus* (Tierra del Fuego), f.171 *P. sectator* (24 December 1769), f.174 (New Holland), f.180 *Phaeton athereus* (Tahiti), f.181 *P. erubescens* (southern ocean, Tahiti), f.190 *Larus gregarius* (Tierra del Fuego), f.194 *L. crepidatus* (within the tropics), f.196 *L. fuliginosus* (Rio de Janeiro), f.197 *L. nigricans* (Brasil), f.201 *L. skua* (Ocean Australiam), f.208 *Sterna nasuta* (New Holland), f.210 *S. nigripes* (Tahiti), f.240 *Otis pileata* (Bustard Bay, New Holland), f.267 *Loxia nitens* (Brasil), f.275 *Motacilla avida* (28 September 1768), f.277 *M. velificans* (3 September 1768).

AMPHIBIA – f.14 *Testudo mydas* (New Holland), f.16 *T. caretta* (south Atlantic Ocean), f.104 *Boa pelagica* (Mare Pacifico), f.139 *Anguis marina* (New Holland – New Guinea), f.143 *Raja areata* (Totaranui, New Zealand), f.153 *R. nasuta* (Totaranui, N.Z.), f.159 *R. aquila* (Murderer's Bay, N.Z.), f.162 *R. rostrata* (New Holland), f.189 *Squalus lima* (off Novam Zelandica), f.193 *S. mystax* (New Holland, Sting Ray's Bay), f.207 *S. carcharias*, f.211 *S. glaucus* (Osnabrugh Island), f.238 *Balistes monoceros* (Atlantic Ocean), f.261 *Diodon erinaceus* (Atlantic Ocean, 7 October 1768), f.296 *Syngnathus pelagicus* ("Fuco natante Oceani Atlanti").

PISCES – volume 1, f.8 *Muraena guttata* (Madeira & Rio de Janeiro), f.99 *Coryphaena hippurus* (meristics for two fishes given); f.107 *C. novacula* (Madeira), f.130 *Scorpaena patriarcha* (Madeira), f.134 *S. chorista* (Madeira), f.156 *Pleuronectes rhomboides* (Madeira), f.161 *Chaetodon gigas* (Brasil at Rio de Janeiro), f.166 *C. cyprinaceus* (mid-Atlantic, 15 October 1768), f.168 *C. incisor* (Brasil), f.176 *C. luridus* (Madeira), f.193 *Sparus sargus* (Madeira), f.200 *S. griseus* (Madeira), f.208 *S. mundus* (Madeira), f.216 *Callyodon rubinosum* (Madeira).

– volume 2, f.11 *Labrus lunaris* (Madeira), f.27 *Sciaena angustata* (Madeira), f.30 *S. labiata* (Brasil), f.34 *S. rubens* (Brasil), f.57 *Perca asellina* (Rio de Janeiro), f.59 *P. nebulosa* (Brasil), f.63 *P.*

decorata (Madeira), f.67 *P. imperator* (Madeira), f.94 *Scomber scombrus* (Madeira), f.95 *S. pelamis* (Rio de Janeiro), f.101 *S. thynnus* (Ohitirhoa, Pacific Ocean), f.106 *S. lanceolatus* (Thrum Cap Island, Pacific Ocean), f.111 *S. serpens* (Canary Islands), f.115 *S. falcatus* (Brasil), f.119 *S. trachurus* (Madeira), f.121 *S. amia* (Brasil), f.125 *S. saltatrix* (off Brasil), f.128 *Mullus barbatus* (Otaheite), f.209 *Mugil albula* (Otaheite), f.213 *Exocoetus volitans* (Atlantic Ocean), f.269–272 are lists of fishes from Brasil and Rio de Janeiro, f.274–279 are lists of fishes from Madeira with vernacular names.

MOLLUSCA – volume 1, f.13 *Fasciola pelami* (in *Scomber pelamis* Atlantic Ocean, 1 October 1768), f.14 *Fasciola tenacissima* (in *Squalus glaucus* southern ocean 11 April 1769), f.17 *Sipunculus piscium* (in *Scomber pelamis* 1 October 1768), f.19 *Limax ramentaceus* (southern ocean 1, 2 October 1769; 11 January 1770), f.23 *Mimus volutator* (Atlantic Ocean, 4 October 1768, southern ocean 13 March 1769, 11 April 1770), f.26 *Doris complanata* (southern ocean 19 September 1769, 13 April 1770), f.44 *Actinia natans* (southern ocean, 12 April 1770), f.50 *Dagysa gemma* (numerous localities), f.52 *D. nobilis* (no data); f.53 *D. saccata* (Atlantic Ocean near Spain, 3 September 1768), f.55 *D. volva* (Atlantic Ocean, 3 October 1768), f.57 *D. limpida* (Atlantic Ocean, 4 October 1768), f.58 *D. lobata* (Atlantic Ocean, 4 September 1768), f.60 *D. corputa* (Atlantic Ocean, 2 September, 6 September 1768, 6 October 1769), f.62 *D. vitrea* (Atlantic Ocean, 7 October 1768, southern ocean, 3 February 1769, 13 April 1770), f.64 *D. vitrea* (no data), f.66 *D. rostrata* (Atlantic Ocean, 1768, southern ocean, 2 October 1769), f.68 *D. strumosa* (Atlantic Ocean near Straits of Gibraltar, and off New Holland, 23 April 1770), f.70 *D. serena* (southern ocean, 2 October 1769, 11 January 1770), f.72 *D. polyedra* (southern ocean, 2 October 1769), f.80 *Holothuria physalis* (Atlantic ocean), f.83 *H. physalis* (surface between the Tropics, 7°S Lat.), f.84 *H. physalis* (Atlantic Ocean, 22, 23 December 1768), f.86 *H. obtusa* (Pacific Ocean, 3 February 1769, 11 January, 11 April, 23 April 1770), f.89 *Scyllaea pelagica* (surface of Atlantic in floating algae), f.97 *Sepia octopodia* (Madeiran vernacular), f.99 *Calliroe bivia* (surface of tropical Atlantic), f.102 *Medusa rutilans* (Atlantic Ocean between the Tropics), f.104 *M. porpita* (Atlantic between Madeira and the Canaries; southern ocean, 13 April 1770), f.107 *M. punctulata* (Rio de Janeiro), f.110 *M. plicata* (between Tierra del Fuego and Staten Land), f.112 *M. radiata* (off Rio de Janeiro, 13 April 1770 (*sic*); New Holland, 23 April 1770), f.113 *M. fimbriata* (Rio de Janiero harbour), f.114 *M. vitrea* (southern ocean, 19 September 1769, 2 October 1769), f.116 *M. crystallina* (off Brasil), f.117 *M. limpidissima* (Tierra del Fuego), f.119 *M. obliquata* (near Tierra del Fuego), f.120 *M. pellucens* (off Brasil), f.122 *M. pelagica* (Atlantic Ocean – several dates; New Zealand, 23 April 1770), f.124 *M. circinnata* (Sting Rays bay, New Holland), f.126 *Phyllodoce velella* (Atlantic Ocean, 7 October 1768; southern ocean, several dates), f.134 *Beroe marsupium* (Atlantic Ocean), f.135 *B. bilabiata* (Atlantic Ocean), f.137 *B. incrassata* (Atlantic near Tierra del Fuego), f.139 *B. carolata* (Atlantic near Brasil), f.140 *B. coarctata* (southern ocean, 2 & 6 October 1769), f.142 *B. biloba* (southern ocean, 13 April 1770).

– volume 2, f.77 *Lepas anserifera* (southern ocean, 23 October 1769), f.79 *L. anatifera* (Atlantic Ocean), f.82 *L. fascigularis* (Bay of Biscay, 7 July 1771), f.86 *L. pellucens* (surface off Brasil), f.88 *L. vittata* (on *Endeavour* between Canaries and Brasil), f.91 *L. asperata* (southern ocean, 1 October 1769, 11 January 1770), f.155 *Solen radiatus* (Java), f.158 *S. albatus* (Java).

– volume 3, f.46 *Tellina radiata* (Brasil), f.94 *T. rugosa* (Pacific Ocean near Tahiti).

– volume 4, f.28 *Donax cuneata* (Nova Cambria)*, f.73 *Venus plebeja* (Nova Cambria)*, f.81 *V. maculata* (Nova Cambria* & Brasil), f.107 *V. fimbriata* (Pacific Ocean)†, f.110 *V. reticulata* (Nova Cambria)*, f.111 *V. rigida* (Brasil), f.120 *V. dilata* (Brasil)†, f.133 *V. pectinata* (Pacific Ocean)†, f.172 *V. juvenea* (Nova Cambria)*, f.186 *V. erosa* (Pacific near Nova Cambria)*, f.201 *V. opaea* (Nova Cambria, Nova Zelandia)*.

– volume 5, f.7 v. *Spondylus gaderopus* (Pacific), f.29 *Chama calyculata* (Pacific Ocean)†, f.63 *Arca barbata* (Pacific Ocean)†, f.67 *A. modiolus* (Nova Cambria)*, f.91 *A. abbreviata* (Nova Cambria)*†, f.106 *A. duplicata* (Nova Cambria)*, f.122 *A. plebeja* (Nova Cambria)*, f.123 *A. puella* (Nova Cambria)*, f.126 *A. striatula* (Nova Cambria)*, f.130 *A. turgens* (Nova Cambria)*.

– volume 6, f.53 *Ostrea lima* (Pacific Ocean, Nova Cambria)*, f.54 *O. malleus* (Pacific Ocean, Nova Cambria)*, f.75 *O. cimplanata* (grows on ships in the ocean).

– volume 7, f.50 *Mytilus margaritiferus* (Pacific Ocean, Tahiti), f.59 *M. senilis* (New Zealand, Pacific Ocean)†, f.61 *M. jubatus* (Pacific Ocean, Tahiti)†, f.83 *M. discurs* (New Zealand), f.96 *M. durus* (Pacific Ocean, Nova Cambria)†, f.129 *Pinna dentata* (Pacific Ocean, Tahiti)†.

– volume 8, f.5 *Conus imperialis* β (Pacific Ocean)†, f.15 *C. virgo* (Pacific Ocean, Tahiti), f.45 *C. ebreus* α (Pacific Ocean, Tahiti), f.57 *C. striatus* (Pacific Ocean, Tahiti)†, f.76 *C. arenatus* β (Pacific Ocean, Tahiti), f.81 *C. asper* (Pacific Ocean)†, f.167 *C. olivaceous* (Pacific Ocean)†, f.181 *C. pulicanus* (Pacific Ocean, Tahiti).

– volume 9, f.21 *Cypraea caputserpentis* g (Tahiti), f.64 *C. achatina* (Tahiti), f.68 *C. aurora* (Tahiti), f.98 *C. pressa* (Tahiti), f.122 *Bulla imperialis* (Pacific Ocean, near Tahiti).

– volume 10, f.30 *Voluta oliva* q (Tahiti).

– volume 11, f.16 *Voluta aspera* (Pacific Ocean near Tahiti), f.26 *V. carbonaria* (Pacific Ocean, New Holland), f.88 *V. insularis* (Pacific Ocean near Tahiti).

– volume 12, none.

– volume 13, f.63 *Buccinum validum* (sea near New Zealand), f.115 *Murex tritonis* (Madeira).

– volume 14, f.3 *Turbo fluitans* (Pacific Ocean, 21 March 1769), f.17 *Helix violacea* (Atlantic Ocean between the tropics), f.19 *H. janthina* (Fig.Pict.) f.61 *Alcyonium frustrum* (Atlantic off southern America), f.62 *A. anguillare* (Atlantic Ocean near Tierra del Fuego).

LEPIDOPTERA – 1 and 2 none.

NEUROPTERA & HYMENOPTERA – f.198 *Vespa tepida* (Labyrinth Bay, New Holland), f.200 *V. spiricornis* (Stingrays Bay, N.H.), f.206 *V. humilis* (Stingrays Bay, N.H.), f.208 *V. rudis* (Labyrinth Bay, N.H.), f.215 *Apis concinna* (Stingrays Bay, N.H.), f.228 *A. astuans* (Labyrinth Bay, N.H.), f.233 *Formica medullaris* (Bustard Bay, Labyrinth Bay, N.H.), f.234 *Formica viridis* (Bustard Bay, Labyrinth Bay, N.H.).

DIPTERA & APTERA – f.72 *Podura maritima* (Bay of Biscay), f.93 *Pediculus procellaria* (on *Procellaria crepidata*, Atlantic Ocean), f.94 *P. diomedea* (on *Diomedea*, S. Atlantic Ocean), f.95 *P. clypeatus* (on *Phaetontis* & *Procellaria*, Pacific Ocean), f.100 *Acarus motacillae* (on *Motacilla avida*, 70 nautical miles off Cape Blanco, Africa), f.101 *Acarus phaetontis* (on *Phaetontis* in southern Ocean), f.113 *Cancer quadratus* (Funchal, Madeira), f.116 *C. ocellatus* (New Holland), f.118 *C. pelagicus* (New Holland), f.121 *C. bulla* (Bustard Bay, New Holland), f.123 *C. natatilis* (New Holland), f.125 *C. depurator* (Atlantic Ocean); f.136 *C. caerulescens* (tropical Atlantic Ocean); f.142 *C. amplectans* (Atlantic Ocean off Brasil), f.145 *C. fulgens* (off Brasil at surface), f.150 *C. crassicornis* (off Brasil at surface), f.153 *C. gregarius* (off Patagonia), f.165 *C. vitreus* (off Brasil at surface), f.182 *Monoculus piscinus* (on *Scomber* Pelamid Atlantic Ocean), f.192 *Carcinium opalinum* (near France, Atlantic Ocean), f.194 *C. macrouram* (near France, Atlantic Ocean), f.198 *Onidium gibbosum* (near Portugal, Atlantic Ocean, inside *Dagysas*), f.202 *O. oblongatum* (Atlantic Ocean, inside *Dagysas*), f.206 *O. spinosum* (Atlantic Ocean), f.213 *Oniscus chelipes* (in algae off France, Atlantic Ocean).

HEMIPTERA – f.2 *Blatta domestica* (in Madeira culinis – not described).

COLEOPTERA – vol. 3 f.139 *Meloe ruficollis* (in the ship August 26, 1768 – the day the *Endeavour* sailed!).

The Mollusca volumes in particular are difficult to interpret with regard to *Endeavour* material. Many slips deriving from the Portland collection and also Banks's collection are localized simply Pacific Ocean and in general these are not itemized above. Solander's work on the Portland shells was undertaken late in his life and two entries with 'Habitat in Oceano

pacifico' are also dated 1780 (Mollusca vol. 11, f.48 *Voluta decorata*, and f.63 *V. fuliginosa*). Clearly these specimens could have been collected on the *Resolution*, or some other voyage to the Pacific. The point is reinforced by two entries in Mollusca volume 4 (f.157 *Venus peregrina* and f.162 *V. antiquata*) where the entry is for Pacific Ocean and 'Novam Cambriam' respectively and the source of the specimens is J.R. Forster which is deleted and JB (= Joseph Banks) substituted. These specimens were therefore collected by Forster on the *Resolution* and were sold (or given) to Banks for his collection. The locality Nova Cambria which occurs in one of these cases was a later usage than the *Endeavour* voyage when the eastern Australian coast was usually refered to as New Holland. It might therefore be inferred that all the references to Nova Cambria in the slip catalogue relate to post-*Endeavour* voyage specimens. The entries for Nova Cambria, mostly in volumes 4, 5 and 6, are asterisked in the above summary (*).

Parenthetically, it can be said that the notes on *Phyllodoce velella* . . . are dated 20 August 1772, with position 59°44′N, 10°10′W of London. They thus derive from three large specimens collected by Banks on that day from his small boat which he launched during a calm, about 90 miles southwest of the Faroes. This was much further north than he expected to find the species which in his experience came no higher than Mediterranean latitudes. [*See* Banks, Joseph 1772, Journal of a Voyage to the Hebrides, Iceland and the Orkneys, BM(NH) General Library, typescript copy by H.B. Carter, f. 39.]

The possession of specimens in the Banks or Portland collections does not necessarily prove that they were part of the *Endeavour* collection, even if they have the general locality associated with one of the places visited on the voyage, because both collectors certainly received later-collected material. In the case of Solander's personal collection, however, it can be fairly assumed that if he possessed a shell (and Banks also had the same species) then it was an *Endeavour* specimen. The incidences of this are denoted in the above lists by a dagger (†).

COPIES OF ORIGINAL MANUSCRIPTS

Fair copy of descriptions of fishes and other animals obtained on Cook's First Voyage. 401 p. 20 cm. (D. & W. 41)

This is a bound volume of transcriptions of the first three zoological manuscripts discussed above (D. & W. 40a–c), the handwriting having been identified as that of Banks's Amanuensis B by Marshall (1978). It follows the original closely although the writer adopted a more disciplined use of underlining and has rearranged certain sections within some descriptions to produce a more consistent layout. In both P.A. and P.N.H. the entries for birds and crustaceans have been copied, but the bird descriptions in P.A.O.P. are not reproduced. None of the tipped-in sheets of vocabularies in the original are copied. The only major difference from the original sections (apart from the omission of A.J.C. and the notes on Icelandic fishes and birds) is that each separate description commences on the recto of a new leaf even if it continues for two following pages. This may merely be an aspect of the greater discipline in layout, but it could have resulted in a loose-leaf system capable of resorting into systematic or alphabetical sequences.

Copies of Solander's Descriptions of Animals, made during Captn. Cook's First Voyage [loose title-page, sheet 23 cm]. (D. & W. 42)

A fair copy of the descriptions of animals observed during Capt. Cook's first voyage 512 p. 32.5 cm.

Both titles refer to the same manuscript which is a later copy of Solander's descriptions of animals made during the *Endeavour* voyage. The recorded pagination is the total in a later hand, but at some time it has been reorganized with a double sequence of numbers between f.133 and f.279 – the numbers were probably inserted by Averil Lysaght in the 1950s for she re-ordered the sheets, and indexed the manuscript then.

This manuscript is a copy of many of Solander's notes on marine animals and land birds caught at sea. It comprises descriptions of birds p.1–123, reptiles p.125–131, the Linnaean class Amphibia Nantes (sharks, rays, trigger fishes etc) p.133–197, fishes p.199–277, and invertebrates p.279–511. It is arranged in accordance with the twelfth edition of Linnaeus's *Systema Naturae* (1766–1767), with hitherto unrecognized species marked for insertion between two numbered species in that edition. However, it does not include all the marine fishes recorded in other manuscripts notably P.A.O.P. (D. & W. 40c), although all the fishes recorded in the *Slip Catalogue* (D. & W. 45) Pisces 1 and 2 which were those caught at Madeira, in the tropical Atlantic and at Rio de Janeiro are included, and isolated species from the Pacific (*Raja aquilla* from Murderer's Bay, New Zealand, *Scomber lanceolatus* and *Scomber thynnus* from the tropical Pacific Ocean, and *Squalus glaucus* from Osnabrugh Island also tropical Pacific) are included. Of these only *Scomber thynnus* from Osnabrugh Island is included in P.A.O.P. in which manuscript it has been deleted.

For birds again most of the entries are copies of those descriptions in the *Slip Catalogue* (S.C. Aves), while none of those described in the three Pacific Ocean manuscripts (P.A., P.N.H., and P.A.O.P.) have been transcribed. However, there are entries in this manuscript which are not now represented in the *Slip Catalogue* notably the Solander petrel genera *Procellaria* and *Nectris* for which there are no sheets in S.C. This may, of course, mean no more than that they were lost, or removed from the *Slip Catalogue* at some time after the copy was made.

The entries for invertebrates contain a heavy preponderance of Atlantic Ocean specimens described but some Pacific Ocean entries are included. These can only have been copied from the *Slip Catalogue*, because there are only six (mostly crustaceans in the genus *Cancer* according to Solander) included in the other manuscripts (P.A.O.P. and P.N.H.) and significantly none of these are included in the present manuscript.

The conclusion therefore is that this copy of Solander's notes was made primarily from the loose slips which he employed for his *Slip Catalogue*, although limited use was made of the manuscripts from the Pacific part of the voyage. This copy was therefore a bringing-together of the scattered *Endeavour* notes in the *Slip Catalogue* because until the expedition reached the Pacific Ocean Solander had recorded his zoological notes on slips, not in a chronologically sequenced journal such as he used in New Zealand, Australia, and the islands of the Pacific.

This manuscript has been said to be incomplete by Marshall (1978) who wrote 'Many sheets are obviously missing'. Certainly, the manuscript was at one time disordered until in the 1950s Averil Lysaght put parts of it into order following Linnaeus's *Systema Naturae*, but there is no evidence that any part of it is missing. It is certainly incomplete in that it is a copy of only part of Solander's notes from the *Endeavour* voyage, but there is no evidence that it was ever intended to form a complete record of the zoology of the voyage.

Possibly Marshall was influenced to make this claim because other authors have claimed that this manuscript copy was 'lost' for many years. The origin of the statement was Gregory Mathews (1912–1913) who wrote, 'The MS. was Banks' property, and was mislaid until I discovered it in the British Museum', supplemented by Iredale (1913) who repeatedly asserted that the manuscript had been 'thrust into some corner' until Mathews's persistent

enquiries had revealed it put away and labelled as 'Copies of Solander MSS'. Surprisingly for such a careful worker Lysaght (1959) repeated these statements that it had been mislaid and rediscovered. This manuscript was cited extensively by Kuhl (1820), by Gray in 1871 (see Iredale, 1913), by Sharpe (1906), and was listed in the *Catalogue of the Books, Manuscripts, Maps and Drawings in the British Museum* (*Natural History*) 5 (1915), and it seems to have been well enough known at the time Mathews claimed to have rediscovered it.

A manuscript copy of Solander's notes on fishes is in the Bibliothèque Centrale du Muséum, Paris, (MS 1109). This transcription (of which I have seen a microfilm) comprises 358 folios and is alphabetically arranged by genus to include a total of 245 species. The handwriting does not appear to be the same as any of Banks's staff or amanuenses (J.B. Marshall, pers. comm.). It is probably in the hand of a clerk employed to take a copy. It derives descriptions from all the known manuscripts – P.A., P.N.H., P.A.O.P. (D. & W. 40a, b, c) from C.S.D. (D. &. W. 42), and the *Slip Catalogue* (Pisces 1 & 2) (D. & W. 45), and is therefore the only place in which all the descriptions of fishes from both the Atlantic and the Pacific Oceans are gathered together.

A copy of Solander's notes, and copies of many Parkinson drawings were made for Cuvier (the drawings by Mrs Bowdich) and were cited by both Cuvier and Valenciennes in their *Histoire naturelle des Poissons* (1828–1848). This Paris manuscript is probably the one made for Cuvier.

The original manuscripts and the Banksian fair copies were kept in Banks's library in close proximity to the drawings. They were catalogued by H.F. Cary and H.H. Baber in January 1832 (see Diment & Wheeler, 1984) and all the zoological manuscripts can now be recognized except for a quarto *Catalogues of South Sea fishes*, which is no longer present in the collection. The manuscripts were later with Robert Brown in the British Museum and thus still in close association with the drawings. Not until the late nineteenth century were the zoological manuscripts transferred to the Zoological Department, and the major one *Original descriptions of fishes and other animals* (D. & W. 40) was accessioned in that Library in 1875.

The Collection as a Zoological Resource

At the time of the *Endeavour* voyage (1768–1771) the state of systematic zoology was represented by the twelfth edition of Linnaeus's *Systema Naturae* (1766–1767). A copy of this work was taken on the voyage and was clearly used as a 'field guide', albeit an incomplete guide and valid only for that part of the voyage in the Atlantic Ocean. Possibly it is this copy which is now preserved in the Zoology Library of the British Museum (Natural History) bound with interleaving and copious notes in Solander's handwriting, although I now incline to the view that these annotations were made after the conclusion of the voyage. Nevertheless this edition of Linnaeus was the latest state of the art when the *Endeavour* sailed. As such it can now be seen to be very imperfect, being especially poor in its representation of the tropical marine and terrestrial faunas in general and of the biota of the Indian and Pacific Oceans and their marginal landmasses in particular.

With the return of the expedition there is clear evidence that the primary objective of Joseph Banks was the production of a series of books describing the botany of the voyage (Carter *et al.* 1981, Diment *et al.* 1984). Although a great deal was accomplished towards this objective it finally foundered probably from several causes, amongst them the death in 1782 of the naturalist Daniel Solander (Wheeler, 1984*a*, *b*), the spiralling cost of book

production, the political situation in Europe in the late eighteenth and early nineteenth centuries, and the increasing preoccupation of Banks with other affairs. Possibly had the projected great botanical work been finished and published Banks might have turned to the preparation of a comparable book on the animals of the *Endeavour* voyage. However, this seems never to have been seriously considered. Unlike the botanical drawings none of the animal drawings were finished or copied by Banks's later team of artists, and so far as is known, none was ever engraved on copper plates as a first step towards printing. The most that was attempted was the reproduction of Solander's zoological manuscripts by copyists (see Diment & Wheeler, 1984, numbers 41 and 42) but these copies were more likely to have been made as an 'insurance' against the loss of data in the event that the originals were destroyed. Of the two, number 42, the *Copies of Solander's Descriptions*, was the nearly complete compilation of Solander's notes made on the voyage presented in an organized and disciplined manner such as would be needed were the results to be collated for eventual publication. However, these notes were themselves incomplete for many of the animals, especially the invertebrates, which were collected during the voyage. It seems that so great was the concentration on the botanical collection and artistic and literary results that Solander never seriously worked on the animals collected. Not even the most dramatic of all, the kangaroos, even though a manuscript description was prepared and skins and at least one skull were brought to England, were ever formally described and published by Solander or Banks.

Solander's later career as Banks's librarian and scientific aide and his increasing responsibilities within the British Museum left less and less time for work on the zoological material. In addition, he appears to have suffered from a disposition which rendered him unable to deny help when called upon by others. Thus, after the *Endeavour* voyage he continued his collaboration with John Ellis (1710–1776) and in 1774 and 1775 was working on Ellis's, and John Fothergill's corals (and probably those collected during the voyage), while between January 1778 and June 1779 he was working on the shell collection of the Duchess of Portland. These distractions, as well as the voyage to Iceland with Banks from 12 July to 29 October 1772, must have all contributed to the gradual loss of impetus that the study of the *Endeavour* collections suffered.

The few tangible results from the *Endeavour* expedition may have contributed to the adverse comments made about Solander by later authors. The comments of Smith (1821) were especially harsh, but Smith was only 23 years of age when Solander died and may never have met him. Moreover, his comments (which perhaps significantly were not published until after Sir Joseph Banks was dead) were probably prompted from a desire to disparage the naturalist who had so closely worked with Banks in his most vigorous years. Later authors parroted Smith's criticisms, and Boulger (1898) added that Solander 'published nothing independently', which was quite untrue (Wheeler, 1984*b*) but served to advance the prejudice shown by this and several later authors.

However, whether as the result of a deliberate policy decision, or stemming from Banks's natural generosity in making available his collections and library to competent workers, the zoological material was studied from soon after the return of the *Endeavour*. Two such workers were outstanding. P.M.A. Broussonet (1761–1807) visited England for two years from 1780 and worked on Banks's collection and that of the British Museum especially on fishes. Broussonet's main publication from this collaboration was the first decade of the *Ichthyologia* (1782) in which ten species were described from Cook's voyages, some of which were from the *Endeavour* expedition. This was clearly intended to be the first of several decades under this title but no others were published. However, Broussonet is believed to

have identified many of the fish drawings by writing binominal names on the sheet. Moreover, he communicated a list of names in the genus *Chaetodon* s.l. to J.F. Gmelin who published them in the thirteenth edition of the *Systema Naturae* (Gmelin, 1789). Several of these were manuscript names which derived from the *Endeavour* voyage. Later, Broussonet had a number of fishes from Banks's collection at the Faculty of Medicine in Montpellier which by 1828 had been sent to the Muséum National d'Histoire Naturelle in Paris where Cuvier, and later Valenciennes used them to supplement the notes made from the Solander manuscripts and the copies of the drawings while they were writing the *Histoire naturelle des Poissons*. Many of these preserved fishes are still in the Muséum in Paris (23 specimens are listed by Bauchot (1969)). Bauchot, in her valuable study of this collection, showed that these came from both the first and second Cook voyages, and also that there were several from Jamaica (which was not visited during the Cook voyages). Either Banks had received specimens from Jamaica (perhaps from his botanical collector, Roger Shakespear), or these specimens actually came from the British Museum collection, for Shakespear had been the collector of a large number of Jamaican fishes described by Solander in the British Museum.

Another scholar who used the Banksian collection, this time of arthropods, was J.C. Fabricius (1745–1808). A pupil of Linnaeus, he met Solander in London in 1767. At that time Solander was engaged in cataloguing the British Museum insect collection, and was actively collecting insects in the vicinity of London (Wheeler, 1984*a*) – work which might have been stimulated by Fabricius's presence. From 1772–1775 Fabricius spent each summer in London and in his autobiography (Hope, 1845) Fabricius recorded 'My friends Mr. Banks and Dr. Solander had returned from their voyage round the world, and had brought with them innumerable specimens of natural history and insects. I now lived very pleasantly. With Banks, Hunter and Drury, I found plenty of objects to engage my time, and every thing which could possibly be of service to me.' At Easter 1775 his *Systema Entomologiae* (Fabricius, 1775) was published, a work which in its perception of insect classification and description replaced the insect section of Linnaeus's *Systema Naturae*. Of approximately 1500 new taxa in the *Systema Entomologiae* about 500 were described from specimens in Banks's collection (Zimsen, 1964), many of which can be associated with the *Endeavour* voyage and others can be found in Fabricius's later works.

Where drawings of the animal exist it is difficult to be certain whether Fabricius worked with the drawing, or the specimen or specimens from which the drawing was made, or perhaps from both drawing and specimen. In the case of the feather mite and many of the crustaceans he described, which were figured by Parkinson, it is probable that he saw the drawing. In any event, no specimens of these taxa from the *Endeavour* voyage can be found today so the drawings are the only available evidence of the features of the animal. They thus have some status as types for taxonomic purposes.

This assumption that Fabricius made use of the artistic materials in Banks's collection is strengthened by the many names of Fabrician species which have been added to the drawings of Lepidoptera and Coleoptera in the British Museum (Prints & Drawings 199a8 and 199*BL) which Wheeler (1983) suggests were written by Fabricius in identifying the insects. Several of the species concerned were described as 'Mus. Dom. Banks' and this probably referred to the drawing by Parkinson in these collections.

Several birds were described from *Endeavour* material while the collection was still in Joseph Banks's ownership, mostly by John Latham (1740–1837). For example, *Cyanoramphus zealandicus* was described by Latham (1781) as the 'Red-Rumped Parrot' based on 'a fine specimen . . . now at Sir Joseph Banks's', and Latham (1785) described the Black-billed

Tropic Bird from a specimen in Banks's possession. However, Latham also made use of the drawings, perhaps in cases where no specimens existed and his account of the Frigate Petrel is based on the drawing in the collection (Latham, 1785; 1790).

The French artist and naturalist C.A. Lesueur (1778–1846) who, with François Peron, laid the foundations of the study of the Phyllum Cnidaria, examined the *Endeavour* drawings of medusae and on some wrote notes, referring to their classification. These notes on the drawings are quoted in the annotations in the Catalogue. Lesueur visited England in 1815 when he was on his way from France to North America at the commencement of his exploration of the natural history of that continent. Whether Lesueur saw only the drawings is not known, but he must have examined them in Banks's Library at that time, when Solander's manuscripts were also kept there (but Solander had been dead for thirty years at the time of his visit). Although a specimen of *Physalia physalis* is believed to be still in existence from the voyage it seems unlikely that many medusae had been preserved, or survived in preservatives from the voyage.

Another naturalist who studied the drawings and used them for descriptions of new animals was Heinrich Kuhl (1797–1821). Kuhl (1820) described several species of petrel (Procellaridae) using the Parkinson drawings as the basis for his descriptions (see, for example numbers 23 and 24 this catalogue). He appears to have cited only the drawings and made no reference to the Solander manuscripts, but in several cases adopted Solander's unpublished binominal name. From the date at which Kuhl's names were published it is clear that he saw the drawings while they were still Banks's property and kept at Soho Square.

Other naturalists during Banks's lifetime undoubtedly enjoyed the use of the drawings but have left little evidence of the use to which they put them. Some received information from Banks directly and reproduced copies of the drawings, for example J. Macartney (1810) in his study of luminous animals quotes Banks on the light production of a small crustacean (see number 226 in this catalogue), as well as reproducing the figure of *Cancer fulgens*.

After Banks's death in 1820 the drawings became the property of Robert Brown, but by 1827 they had passed to the British Museum. They were at first kept with the Banks botanical material presumably in the direct care of Robert Brown, and as late as August 1842 John Edward Gray (1800–1875) consulted the zoological drawings and manuscripts in the Botanical Department for his essay on the fauna of New Zealand (Gray, J.E., 1843*a*). Perhaps as early as 1830 G.T. Lay and E.T. Bennett compared Parkinson's drawings of fishes from the tropical Pacific with those collected on Beechey's voyage on the *Blossom* (1825–1828) and used at least one as the basis of their illustration, see number 131 in this catalogue. Some time after this both the drawings and the manuscripts had been consulted by Johannes Müller (1801–1858) and J. Henle (1809–1885) for their definitive treatment of the sharks and rays (Müller & Henle, 1838–1841). Although their introduction was dated November 1840 this must have been written for production with the third and final Heft of the volume, of which Heft 1 was issued in 1838. This means that their visit to London was earlier than 1838 when J.E. Gray made available the collections of the British Museum including the Banks and Solander materials and Hardwicke's collection of animal drawings. A number of the drawings from the *Endeavour* voyage were annotated by Müller or Henle at the time of their visit.

At around this period the drawings and sometimes the manuscripts were studied by a number of natauralists. John Richardson (1787–1865) identified many of the *Endeavour* drawings of fishes for his paper on the ichthyology of New Zealand (Richardson, 1843*b*), and also the Forster drawings from the *Resolution* voyage which had even greater relevance to New Zealand zoology. Several other of Richardson's publications on fishes of the Pacific

region contain references to the Parkinson drawings (e.g. Richardson, 1842*a*, 1842*b*, 1848) and there is little doubt that he had examined the collection in its entirety in 1840–1841. During the 1840s George Robert Gray (1808–1872) made use of the bird drawings and cited the Parkinson drawing of the Red-tailed Tropic Bird (see number 31 in this catalogue) in his catalogue of the birds in the collection of the British Museum (Gray, G.R., 1844).

The numerous citations of drawings of fishes by Richardson and Cuvier and Valenciennes (who worked from copies of the drawings and an edited fair copy of Solander's fish manuscripts) resulted in the fish drawings becoming taxonomically more important than those of other zoological groups. This led Albert Günther (1830–1910) to examine some of them, and it is thought that a manuscript list of the fish drawings (which is stored with the volumes) was made at his instigation, although it is not in his handwriting. It is not certain, however, that Günther actually studied the whole collection, but rather those drawings which had significance to some taxonomic problem.

A contemporary of Günther's, T.R.R. Stebbing (1835–1926) examined the drawings of amphipod crustaceans in the collection in the early 1880s with Günther's permission. His comments published in the volume describing the *Challenger* expedition Amphipoda (Stebbing, 1888) showed his appreciation of the importance of those drawings which in some cases had been the material on which J.C. Fabricius had based several species names more than a century earlier. Possibly no one had studied these amphipod crustacean drawings between the examination by Fabricius and that by Stebbing.

The bird drawings from the *Endeavour* voyage (and other collections of drawings of birds) were all examined and listed by R. Bowdler Sharpe (1847–1909) who published his identifications in his essay of the bird collection in *The History of the Collections in the Natural History Departments of the British Museum* (Sharp, 1906). This was the single most important study of the bird drawings made, even though parts of the collection had been studied by earlier workers, notably Latham, Kuhl, and G.R. Gray as already discussed. His list formed the basis of part of Lysaght's (1959) later study of the bird paintings which had been in the library of Sir Joseph Banks.

However, within the middle decades of the nineteenth century the emphasis of use had changed. Where the earlier authors, up to Richardson and J.E. Gray, had used the drawings to establish new taxa or to add to faunistic information, later authors (e.g. Günther, Stebbing, and Sharpe) employed them as historical records of earlier naturalists. Thus, after a period of about a century from the voyage the drawings had assumed an archival value which they still retain.

The importance of the zoological drawings is enhanced by the virtual disappearance of most of the zoological specimens since the return of the *Endeavour*. Whitehead (1969, 1978) has painstakingly studied the dispersal of the zoological collections from the Cook voyages and showed that although much of the material from all three voyages came to Banks some of it was dispersed quite quickly while other material was kept by Banks to within a few years of his death. Unfortunately, as material from all the voyages was accumulated together, it is difficult to establish what part of it was *Endeavour* material at the time of its dispersal. The general details of the disperal of each group are given below, but further particulars should be sought in Whitehead's papers from which many of these details are culled.

MAMMALS There is little evidence that mammal specimens were brought back by the *Endeavour*, and very few were described and only four were drawn. It is known that at least one skin and a skull of a kangaroo killed at the Endeavour River landing site was kept;

possibly the skins and skulls of all three kangaroo specimens were retained. At least two and possibly all three kangaroos were dressed and eaten. Banks gave one skull to John Hunter at some time before 1790, and this was later in the Museum of the Royal College of Surgeons but was destroyed by bombing there in 1941. A second skull was drawn by Nathaniel Dance, presumably while in Banks's possession, but it is not known when the drawing was made nor can it be proved that it was an *Endeavour* specimen although it is assumed to be so. There is no evidence that the skins survived (although one was stuffed see p.33), and the whole specimen in spirit which Gray (1843*b*) attributed to having come from Cook's voyages is too small to be the smallest recorded on the *Endeavour* voyage (Wheeler, 1984*b*). It cannot be proved that any other whole mammal specimen was brought back to England.

BIRDS Banks is quoted as claiming to have brought back about 500 bird specimens (Whitehead, 1969, note 2) but this must have been an exaggeration from an expedition which yielded only 32 drawings of birds and 57 species described by Solander. It is true that some petrels were shot on numerous occasions (e.g. *Procellaria velox* was recorded on ten occasions (Lysaght, 1959)) but this would still not amount to 500 specimens. Moreover, a number of the larger birds were eaten after capture. Some of the birds were kept by Banks in whose house they were examined by Latham, Kuhl and other naturalists, but he presented New Zealand birds to the British Museum in January 1773 (which can only have been from the *Endeavour* voyage) and more New Zealand birds to Marmaduke Tunstall. There may have been alcohol-preserved birds in the donations of spirit material Banks made to John Hunter in 1791, and to the British Museum in the same year, but this is not certain. So far as can be established no *Endeavour* voyage birds have survived, which is not surprising in view of preservation techniques available in the eighteenth century other than alcohol preservation.

REPTILES There is no evidence that many reptile specimens were brought to England. Two turtles were drawn on the voyage and it would have been surprising if they were not eaten soon after capture. At least two sea snakes were described and other reptiles mentioned but it is not known if they were preserved. However, a very small aquatic turtle from Batavia is known to have been preserved and kept at Soho Square until 1791 (H.B. Carter pers. comm.).

FISHES Banks's claim (see Whitehead 1969, note 2) that 500 specimens were brought back from the voyage can be accepted in the case of the fishes, for there are lists of preserved specimens in Solander's manuscripts which show that 389 fishes from the Pacific (other than Australia) were preserved. More were certainly saved from Madeira, and possibly Brazil as well; two or three Australian specimens are still preserved in Paris. It is presumed that Banks retained most of the specimens in alcohol at Soho Square until 1791 when he gave about half to John Hunter and the remainder to the British Museum. Hunter's collection became in 1800 the Museum of the Royal College of Surgeons, and Banks's donation was known as the 'New Holland Division', an inapt title if fishes were included for, so far as is known, only two or three Australian specimens were preserved. Later (1809) the Trustees of the British Museum sold a collection of duplicate specimens (which may have included some Banksian specimens) to the Royal College of Surgeons. In 1845 the College donated 348 specimens, some from the New Holland Division, to the British Museum. It is not known how many fishes were included in these transactions, or whether they were *Endeavour* specimens. The only specimens known to me in the Museum collection, which starting together (before 1800) were reunited in 1845, one having gone to the College of Surgeons Museum either via John Hunter or through the Museum duplicates sale, while the other stayed in the British

Museum, are two specimens of *Bathystethus cultratus* (Schneider, 1801); but these can be shown to be *Resolution* voyage specimens (Wheeler, 1981).

The collection of fishes which Banks gave to Broussonet, presumably around 1780–1782 when Broussonet was in England, were later taken to Montpellier, where he held the Professorship in the Faculty of Medicine. Forty-six specimens were later transferred by Cuvier to Paris and the majority of these are still preserved in the Muséum National d'Histoire Naturelle. Bauchot (1969) listed the surviving 44 specimens; possibly as many as 10 could be *Endeavour* specimens.

Other fish specimens are believed by Whitehead (1969) to have passed into the collection of Sir Ashton Lever (1729–1788) which was known as the Leverian Museum. It is not known how he obtained material from the Cook voyages, it may have been from Banks or it may have been through 'unofficial' collections made on the voyages. In 1806 the Museum was sold by auction and the material widely dispersed. Two surviving lots of fishes were reported by Whitehead, one in the Naturhistorische Museum in Vienna, the other in the Cuming Museum in London. The Vienna specimen was probably purchased at the Leverian sale by Leopold von Fichtel acting on behalf of the Austrian emperor; the London one was certainly purchased by the natural history collector Richard Cuming, whose collection formed the Cuming Museum, Southwark. Although Whitehead wrote that he searched the Cuming Museum and 'discovered' a box of dried fishes the credit for their discovery belongs properly to Raymond Chaplin when he was Assistant Curator at the Cuming Museum in the 1950s for he first drew them to attention.

INVERTEBRATES There is abundant indirect evidence for the collection of a large number of invertebrates but no lists of specimens and such material as has survived was widely dispersed and in most cases has lost such collection data as might have been expected to be associated with it.

Various coelenterates were described and figured but there is no evidence that they were preserved and, with the exception of the siphonophore, *Physalia physalis*, already mentioned, which may be an *Endeavour* specimen, none are known to survive. The corals, which were neither figured nor described, were probably given to John Fothergill (1712–1780), later purchased by William Hunter and thence passed to the Hunterian collection of the University of Glasgow. If any survive they are now in the Zoology Department of the University with shells and insects; but most have lost any supporting data.

None of the salps described or figured are known to have survived.

The mollusc shell collection must have been extensive but there is little contemporary evidence which enables us to assess how large it was or what it comprised. As collectable items shells enjoyed wide dispersal as gifts or by sales. Some were given to the Duchess of Portland (1714–1785) and were listed from *Endeavour* voyage localities in the manuscript at the Linnean Society of London, which I believe is a copy of Solander's catalogue of the collection (see Diment & Wheeler, 1984, number 57), and in the *Portland Catalogue*, the sale catalogue of her collection. From this sale specimens became widely distributed to other collectors. William Hunter also obtained *Endeavour* voyage shells when he purchased Fothergill's collection in 1781, and these also went to the University of Glasgow.

Marmaduke Tunstall (1743–1790) also received shells from the *Endeavour* voyage, presumably from Banks, at a sufficiently early date to be able to send about two hundred shells to Linnaeus (Whitehead, 1978). Tunstall also received three bird specimens from New Zealand from Banks. The shells may be presumed to be in the collection of the Linnean

Society of London, which owns Linnaeus's personal collections, but they are not identifiable as *Endeavour* specimens.

Banks's personal collection of shells was presented by him around 1815 to the Linnean Society of London where it formed part of the general museum collection maintained by the Society. By 1863 the Society's policy regarding collections changed and it was decided to retain only the Linnaean collections and some other plant collections of especial value. The Banks shell collection was given to the British Museum in 1863. Thereafter the cabinet containing the collection lost its identity and was wrongly attributed to another collection until in 1953–1954 the late Guy Wilkins was able to establish its identity as Banks's shell cabinet. Some of the shells are certainly *Endeavour* specimens, others may be, while many are clearly of later acquisition. Full details were given by Wilkins (1955).

The arthropod collections were also distributed by Banks to William Hunter and there is a considerable collection of insects in the Hunterian Collection of the University of Glasgow. Banks's remaining personal collection was given to the Linnean Society between 1811 and 1815, and from thence went to the British Museum. It is today maintained as a separate collection within the Department of Entomology, comprising 11 drawers of Coleoptera and 39 drawers of other orders. The Crustacea have been separated (they are all dry pinned specimens) and are maintained in the Department of Zoology of the British Museum (Natural History).

The insect collections contain many of Fabricius's type specimens of species described from Banks's collections (no crustacean types have been located). Both the insect and crustacean collections now suffer from imperfect labelling in the past and it is in some cases only possible to relate the specimen to locality and collection with the prior knowledge that a specimen of that taxon was captured and should be represented in the collection.

The *Endeavour* animal collections as a whole have been greatly diminished in value by the loss of labels and indentifying data, and in numbers by wide dispersal and in many cases neglect during the nineteenth century. Three significant sets of the original collections remain, the insects, the shells, and the fishes. Both the insect and shell collection deteriorated in value as a result of being inadequately labelled and then mixed with later material received by Banks, and then being added to the poorly-curated Linnean Society collection. By the time they reached the British Museum in 1863 the worst of the damage was done and the importance of the specimens individually could only be established by patient investigation. The shell collection was even completely misallocated within a century of its receipt. The fish collection now survives only as a small fraction of the original 400 or so specimens and it is dispersed though the collection of spirit-preserved material. Perhaps 25 specimens, can be located with certainty in the British Museum (Natural History) and possibly 10 others in Paris.

The history of these collections, which contrasts strikingly with the large amount of botanical material still preserved, heightens the value of the artistic and manuscript record of the voyage. In many cases, for animals described from *Endeavour* material the only extant evidence for the identity of the taxon may be found in the drawings which simply as a record of the animal's appearance show the critical features necessary for identification. The drawings offer a visual record which Solander's handwritten Latin descriptions fail to communicate, even when Solander had by chance described the precise details needed for identification. The drawings by Sydney Parkinson, Alexander Buchan, and Herman Spöring are thus not only an important visual record of the animals seen on one of the world's great voyages of discovery, but also an important zoological resource the use of which is a necessity for the correct interpretation of many early concepts in eighteenth and nineteenth century zoology.

THE CATALOGUE

This catalogue is essentially a list of the zoological drawings made on the *Endeavour* voyage. Although reference is made to Solander manuscripts and the Dryander manuscript *Catalogue* of the Banksian zoological drawings, and to the survival of cognate specimens, they are only discussed with reference to the appropriate drawing. The entries in the catalogue follow a standard format.

Explanation of a Catalogue Entry

SAMPLE ENTRY

1.(**1**:1) *Nycticebus coucang* (Boddaert, 1785) Lorisidae

DRAWING: pencil outline on branch; *r.* [pencil] 'S. Parkinson'; *v.* [pencil] 'Lemur tardigradus/[ink] Princes Island'. 369 × 270.

MANUSCRIPT: Solander – none. Dryander – Catalogue f. 5 as L[emur] tardigradus dormiens —— Batavia, S. Parkinson.

NOTES: Dryander's 'L[emur] tardigradus dormiens' can be presumed to refer to the present drawing. There are no notes by Solander in his manuscripts referring to this animal; probably he never saw it, but he did briefly describe (D. & W. 45; S.C. Mammalia f. 14) *Lemur murinus* and noted that a picture existed; this is presumed to refer to the Stubbs drawing of a lesser mouse lemur, *Microcebus murinus* (J. F. Miller, 1777) which was kept alive in London by Marmaduke Tunstall (Egerton, 1976; Rolfe, 1984).

Lemur tardigradus Linnaeus, 1758, which name was used for this drawing, is confined to India and Sri Lanka.

THE HEADING: '1.(**1**:1) *Nycticebus coucang* (Boddaert, 1785) Lorisidae' represents a serial number, running through the whole collection (recently marked on the drawings by a circled number), the present volume and folio numbers, the modern scientific name of the animal represented so far as identification of it has been possible, and the family name.

'DRAWING: pencil outline on branch; *r.* [pencil] "S. Parkinson"; *v* [pencil] "Lemur tardigradus/[ink] Princes Island". 369 × 270.' represents a short description of the drawing and the medium used, and an exact transcription of annotations on the drawing with notes on the medium in which these annotations are written. *r.* = recto; *v.* = verso; line endings are indicated by an oblique stroke. The size of the paper for the drawing in mm, width × height (the animal viewed in a natural posture). Scientific names in the annotation are not italicized.

'MANUSCRIPT: Solander – none. Dryander – Catalogue f. 5 . . .,' contains citations to the animal represented in the various Solander manuscripts which are cited by the numbers in Diment & Wheeler's (1984) catalogue of Solander manuscripts e.g. (D. & W. 45). These manuscripts are also cited by abbreviations of their titles as follows:

(D. & W. 40a) P.A.: *Pisces Australiae*
(D. & W. 40b) P.N.H.: *Pisces etc Novae Hollandiae*
(D. & W. 40c) P.A.O.P.: *Pisces & Anim. caetera Oceano Pacifici*
(D. & W. 40d) A.J.C.: *Animalia Javaniensia & Capensia*
(D. & W. 41) F.C.: *Fair Copy of Descriptions of Fishes.*
(D. & W. 42) C.S.D.: *Copies of Solander's Descriptions of Animals . . .*
(D. & W. 45) S.C.: *Solander's Slip Catalogue* (entries are followed by the name of the animal group in the volume, and volume number, where needed).

Dryander's manuscript *Catalogue of the animal drawings in the Banks collection* is also quoted, with folio number, the name of the animal, the locality ascribed to it and the artist's name. Again, manuscript scientific names are not italicized but if they were already published names they are printed in italic.

NOTES: under this heading may be given discussion of the identification of the specimen, references to citations of the drawing or manuscript relating to the drawing, and the possible continued existence of specimens.

The catalogue is arranged in the order in which the drawings were bound (probably by Dryander in the late 1700s) and follows the systematic sequence of the *Systema Naturae* (1766–1767). A classified index using a modern systematic sequence is given following the catalogue. An alphabetic index of current and manuscript names follows the classified index.

THE CATALOGUE

1.(**1**:1) *Nycticebus coucang* (Boddaert, 1785) Lorisidae

DRAWING: pencil outline on branch; *r.* [pencil] 'S. Parkinson'; *v.* [pencil] 'Lemur tardigradus/[ink] Princes Island'. 369 × 270.

MANUSCRIPT: Solander – none. Dryander – Catalogue f. 5 as L[emur] tardigradus dormiens —— Batavia, S. Parkinson.

NOTES: Dryander's 'L[emur] tardigradus dormiens' can be presumed to refer to the present drawing. There are no notes by Solander in his manuscripts referring to this animal, probably he never saw it, but he did briefly describe (D. & W. 45; S.C. Mammalia f. 14) *Lemur murinus* and noted that a picture existed; this is presumed to refer to the Stubbs drawing of a lesser mouse lemur, *Microcebus murinus* (J. F. Miller, 1777) which was kept alive in London by Marmaduke Tunstall (Egerton, 1976; Rolfe, 1984).

Lemur tardigradus Linnaeus, 1758, which name was used for this drawing, is confined to India and Sri Lanka.

2.(**1**:2) *Dasyurus hallucatus* Gould, 1842 Dasyuridae

DRAWING: pencil outlines with colour notes; *r.* [pencil] 'Viverra'; *v.* [pencil] 'The

upper part of the body brown ash colour mix^{t} w^{t} black especially among the spots which are white, underpart of the body/pale ash colour the underpart of the tail & furthermost half of the upper part dark brown almost blk eyes black/nose & eyelids fusca'. 356 × 525.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.13 as Viverra —— N.C. (= Nova Cambria), S. Parkinson, unfinished drawing.

NOTES: in a most perspicacious published study, Mahoney & Ride (1984) have shown that this drawing must have been made from a specimen captured in what is now Queensland (probably the Endeavour River landing). The drawing, although poor, with the colour description is referable to *Dasyurus hallucatus* Gould, 1842.

The drawing is of an animal which from the description in Hawkesworth (1773) formed the basis of the name *Mustela quoll* Zimmermann, 1783, a name which hitherto has been regarded as synonymous with *Dasyurus viverinus* (Shaw, 1800). Mahoney & Ride (1984) in the interest of zoological nomenclatural stability have proposed the suppression of Zimmermann's name *Mustela quoll*. Quoll was the vernacular name recorded by Hawkesworth (1773) and the journals of Banks and Parkinson use variants of this spelling which are similar to the names in present use for *Dasyurus* sp. by the Kokoimudji aboriginals whose tribal boundary extended northwards from the Endeavour river.

The skin of presumably this animal was preserved and was referred to by Pennant (1781) who noted that it had lost part of the face and that both the body and tail lengths were thirteen inches. He continued, "This was found near *Endeavour* river, on the eastern coast of New Holland, with two young ones" (followed by a reference to Hawkesworth's account of the voyage).

3.(**1**:3) *Macropus* sp. Macropodidae

DRAWING: unfinished pencil outline, animal crouched; *r.* [none]; *v.* 'Kanguru'. 358 × 525.

MANUSCRIPT: Solander (D. & W. 45) – S.C. Mammalia f.90, f.91–95 as Kanguru saliens. Dryander – Catalogue f.21 'Kanguru N.C., S. Parkinson'.

NOTES: the account of Kanguru saliens by Solander exists in two forms, written on three sides of a double foolscap folded to slip size (f.90), and on five successive slips (f.91–95). The foolscap draft (f.90) is the earlier, containing many corrections, the slips (f.91–95) are fair copies from the earlier draft, but are unique in that they give the measurements and weights of the three specimens examined. Marshall (1977) reproduced the three sides of the foolscap draft, but its sequence was disordered from the manuscript in order to take only two pages of text. Nevertheless, while the foolscap draft (f.90) may be the earlier it is a composite description which was based on at least two specimens (male and female reproductive organs are described). From Solander's manuscript (f.95) the three specimens can be distinguished as follows: a young female of eight pounds weight, a male, two to three years of age, of twenty-four pounds weight, and an adult male of eighty pounds weight. The only length given refers to a specimen 28 inches body length and 26 inches tail length. (This would appear to be in keeping with the smaller male animal.)

Fig. 2 *Macropus* sp. One of two Parkinson sketches of a 'Kanguru'. (Catalogue number 3.)

These weights differ from those given by other sources on the voyage, e.g. Banks's Journal for 14 July 1770 which records the weight as 38 lb. This source records the other specimens as 84 lb, obtained on 27 July 1770 and a third of 8½ lb on 29 July. Parkinson's drawing (see no.4) of a leaping kangaroo suggests he drew the adult male of 84 lb.

One of the smaller specimens was skinned and stuffed, but possibly not stuffed until the *Endeavour* returned to England. Oliver Goldsmith (1791) described the "Kangaroo of New Holland . . . stuffed and brought home by Mr Banks was not much above the size of a hare . . ." (the first edition of this work appeared in 1774 – but I have been unable to consult a copy), while Pennant (1781) reports that the "Length of the largest skin . . . was three feet three inches from the nose to the tail: of the tail two feet nine". This skin (considerably larger than a hare) might have been a specimen from a later voyage.

The identity of the kangaroos from the Endeavour River has been lengthily discussed by many authors, of whom Morrison-Scott & Sawyer (1950) offered the most information based on Solander's manuscripts and Parkinson's drawings. Lysaght (1957), with considerable perspicacity recognized the George Stubbs

portrait, which had dropped out of sight between 1773 and 1957, as the original of the Hawkesworth (1773) illustration in his official account of Cook's first voyage. More recently Carr (1983) has summarized the discussion, the result of which appears to be that the kangaroos (evidently at least two species were involved) from the Endeavour River cannot be positively identified, but Carr confuses the dates of capture of the largest and smallest specimens and this led him into further false assumptions.

4.(**1**:4) *Macropus* sp. Macropodidae

DRAWING: unfinished pencil outline, animal springing; *r.* [none]; *v.* [pencil] 'the whole body pale ash colour the ears excepting the base fine specled gray iris of the eye Chesnut./Kanguru/[ink] C. Endeavour's River [pencil] Endeavours River'. 525 × 358.

MANUSCRIPT: see no.3.

NOTES: see discussion under no.3.

5.(**1**:5) *Macropus robustus* Gould, 1841 Macropodidae

DRAWING: water-colour of skull and lower jaws by Nathaniel Dance; *r.* [ink] 'N. Dance'; *v.* [none]. 480 × 300.

MANUSCRIPT: Solander – [none]. Dryander – Catalogue f.21 'Cranium. Nat[l] Dance'.

NOTES: Morrison-Scott & Sawyer (1950) identified this skull as *Macropus robustus* and considered it to belong to the 80 lb (or 84 lb – depending on source followed) specimen killed on 27 July 1770. They claim that this skull was not the specimen which was given by Banks to John Hunter, which was later in the Museum of the Royal College of Surgeons in London, where it was destroyed by bombing one night in May 1941. These authors consider that the Royal College of Surgeons skull was probably that of the 38 lb animal shot on 14 July 1770. This presumably was Solander's 24 lb specimen although Cook recorded its weight clear of entrails as 28 lb (Sharman, 1970). (See no.3 for discussion of the Endeavour River kangaroos.)

6.(**1**:6) *Muntiacus muntjak* (Zimmermann, 1780) Cervidae

DRAWING: pencil outline of head, lateral and front views; *r.* [pencil] 'Cervus plicatus [cropped in binding] [ink] Parkinson'; *v.* [pencil] 'Cervus plicatus'. 530 × 355.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mammalia f.101–2 notes *Cervus axis* Briss ? Hab. in Java, written in a very unsteady hand, and perhaps referable to the specimen illustrated. Dryander – Catalogue f.23 'C. plicati Mss caput —— Pr. Isl., S. Parkinson'.

NOTES: this drawing seems not to have been supported by Solander notes unless the reference quoted above to the Java animal are relevant.

7.(**1**:7) *Milvago chimango* (Vieillot, 1816) Falconidae

DRAWING: finished pencil outline; *r.* [none]; *v.* [pencil] 'The colour of the beak pale blueish grey the feet a dirty grey blue./[ink] Terra del Fuego/[pencil] N°. 12 Falco'. 295 × 458.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.33 lists a drawing as Falco ——— Tierra del Fuego, S. Parkinson, presumably referring to this drawing. This use of the genus name only confirms that it was not described in manuscript.

NOTES: listed by Lysaght (1959:272), and Sharpe (1906:173).

8.(**1**:8) *Cyanoramphus zealandicus* (Latham, 1790) Psittacidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Psittacus varietas? V. S.N. XIII 329. n.88/[pencil] Aā'; *v.* 'N°.40 Green Peroquet/[ink] Otahite'. 364 × 265.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.41 lists a drawing as Psittacus —— Otaheitee, S. Parkinson, presumably in reference to this drawing.

NOTES: listed by Lysaght (1959:272) and Sharpe (1906:173). This species was named by Latham (1790) based on the descriptions in his earlier account (Latham, 1781:249) of the Red-Rumped Parrot (to which Gmelin (1789) also referred). Latham's (1781) description was based on a 'fine specimen . . . now at Sir Joseph Banks's' although the locality was erroneously given as New Zealand. Latham's earlier account was cited by Gmelin (1789) as *Psittacus novae-seelandiae* (no.83) but the annotation on this drawing in an unknown hand refers to a variety of Gmelin's *Psittacus pacificus* (no.88).

9.(**1**:9) *Vini peruviana* (P.L.S. Müller, 1766) Psittacidae

DRAWING: finished pencil; *r.* [pencil] 'Latham p.255–59/Psittacus taitianius. S.N. XIII :329. n.91/Psitacus [unreadable as trimmed off] Forster Avinna/[ink] S. Parkinson'; *v.* [pencil] 'The face throat & breast white the rump & rect. dirty grey turng. blue towards the edge the feet &/beak a bright Orange Claws black. all the rest of the body w^{t} dark Ultra. shaded w^{t} P.B./like shining blue steel./[partly obscured, ? Otahite] No 3 Blue Perroquet'. 364 × 264.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.39 lists a Parkinson pencil outline of Psittacus —— from Otaheitee.

NOTES: listed by Lysaght (1959:273) and Sharpe (1906:173–4). Latham (1781) in his description of the Otaheitan Blue Parrakeet refers to the notes on the behaviour of this Tahitian bird and the means by which it can be captured, but appears to have derived his morphological details from a specimen in the Leverian Museum and the description and figure of l'arimanon from Commerson's voyage published by Buffon (1779).

10.(**1**:10) *Calyptorhynchus magnificus magnificus* (Shaw, 1790) Psittacidae

DRAWING: unfinished pencil; *r.* [pencil] 'Lath. p.260 n.66'; *v.* [pencil] 'The

Fig. 3 *Cyanoramphus zealandicus* (Latham, 1790). Parkinson's drawing of a Tahitian bird. The Society Islands population was extinct by 1844. (Catalogue number 8.)

whole bird black spots on the head and on the shoulders dirty white the/breast feathers wav'd w^{t} pale brown, the outer feathers of the tail scarlet & yellow/w^{t} narrow facia of black. The iris dark brown the pupil black, the beak dirty white with the point of the upper mandible dark grey./Black Cocatoa'. 525 × 358.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.39 lists a sketch without colours as 'Psittacus – Latham p.260 n.66 —— N.C., S. Parkinson'.

NOTES: listed by Lysaght (1959:273) and Sharpe (1906:174). Latham (1781:260, no 66) referred to the description by Parkinson (1773) of 'black Cockatoos of a large size' met with on the coast of New Holland, and also cited Hawkesworth (1773) but made no reference to this drawing or Banksian specimens.

11.(**1**:11) *Anas flavirostris flavirostris* Vieillot, 1816 Anatidae

DRAWING: finished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak very dark brown ([inserted] changing gradually into) yellowish toward the base of the upper mandible the feet purple brown./the length of the Wing in the natural size $7\frac{1}{2}$ inches./17. Anas antarctica./[ink] Terra del Fuego'. 370 × 270.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Aves f.126–127; (D. & W. 42) C.S.D. f.1. Dryander – Catalogue f.57, as sketch without colours, Anas —— T.d.F., S. Parkinson.

NOTES: listed by Lysaght (1959:273) and Sharpe (1906:174).

12.(**1**:12) *Oceanites oceanicus oceanicus* (Kuhl, 1820) Hydrobatidae

DRAWING: finished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The head, neck, breast & back soot colour, which Gradually/grows paler on the coverts of the Wings to their edges – /which are border'd w^{t} white, the large wing feathers &/the tail of the same sooty colour but shaded with M. blk/the upper coverts of the tail/& the sides pure white. the beak blk as are the Feet w^{t} a spot of yellow on each web./[ink] Decr. 22 1768/[pencil] P. oceanica'. 260 × 370.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.55 records three specimens obtained, the second of which is localized as America australi S.37° (Dec. 23, 1768) and was the one drawn. Dryander – Catalogue f.61, as sketch without colours P. oceanica mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:273–4) and Sharpe (1906:174). Kuhl (1820) referred to this drawing in his original description of the species but also had examined a specimen which was then in Temminck's collection.

13.(**1**:13) *Pelagodroma marina marina* (Latham, 1790) Hydrobatidae

DRAWING: unfinished water colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The throat, breast & belly white the Remiges, Retrices and beak/black the feet black on the webs marks of yellow as mark^{d}/out in the figure. [ink] Dec^{r}. 23. 1768/Lat. 37 South./[pencil] N° 6 Procellaria aequorea'. 265 × 368.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.57 gives the same locality and date. Dryander – Catalogue f.61, as sketch with colours P. a'quorea mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:274) and Sharpe (1906:175). Latham (1785:410) as Frigate Petrel and (1790:826) as *Procellaria marina* referred to this drawing in Banks's collection and based his name on it.

14.(**1**:14) *Fregetta grallaria* (Vieillot, 1817) Hydrobatidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The large feathers of the wing, the tail, Beak & feet/are black the belly & coverts of the tail white./[ink] Dec^r. 23d. 1768./Lat.37. South/[pencil] No 7. Procellaria fregata'. 260 × 366.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.51 gives as locality Oceano America australis. Lat 37°S, and date Dec. 22, 1768. Dryander – Catalogue f.61, as sketch with colours P. Fregata L. —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:274) and Sharpe (1906:175). Lysaght comments that part of Solander's description refers to *Fregata tropica* Gould, but this is at variance with Solander apparently describing only one specimen.

15.(**1**:15) ? *Pachyptila belcheri* (Mathews, 1912) Procellariidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak a pale blueish lead colour – the legs & toes pale blue wt a cast of purple the webs dirty white./14 Procellaria turtur [ink] Feb. 1st. 1769. Lat. 59.00'. 270 × 366.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.65 Oceano Americas antarctico Terre del Fuego. Lat. S.59°. Dryander – Catalogue f.61 as sketch without colours P. Turtur MSS —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:274) and Sharpe (1906:175). *Procellaria turtur* was published by Kuhl (1820) based on the illustration by Parkinson, the annotation of which is quoted, and also to drawing no.16. Kuhl had, however, also seen specimens in the Muséum in Paris, Bullock's museum, and in Temminck's collection. Lesson (1831) also cited *P. turtur* Banks pl.15 probably deriving this from Kuhl.

16.(**1**:16) *Pterodroma longirostris* (Stejneger, 1893) Procellariidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak black the legs & toes pale violet, grey on the outermost toe the webs dirty white & partly grey veind wt dirty purple/22. Procellaria velox./[ink] Feb. 15. 1769. Lat. 48.27″ Long. 93'. 268 × 374.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.67 'Oceano australi', from ten localities and dates between 15 February 1769 and 11 April 1770. Dryander – Catalogue f.61 as sketch without colours P. velox Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:274–5) and Sharpe (1906:175). The name *Procellaria velox*, attributed to Banks pl.16 was published by Lesson (1831) as his Petrel Colombe, although this may have been derived from another source.

17.(**1**:17) *Macronectes giganteus* (Gmelin, 1789) Procellariidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson [pencil] Procellaria gigantea α; *v.* [pencil] 18 Procellaria gigantea/Feb^ry. 2^nd 1769 Lat. 59.S'. 296 × 480.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.73 'Oceano antartico Terra del Fuego S. Lat.58°S'. Dryander – Catalogue f.61. Sketch without colours P. gigantea Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:275) and Sharpe (1906:175). This drawing was referred to by Kuhl (1820), as was the next drawing. According to Kuhl there was a specimen in the British Museum. Latham (1785), referring to the Giant Petrel, also listed a specimen in the British Museum, and noted reports of the species 'by our voyagers at Staaten Land, Terra del Fuego and Isle of Desolation, and other places in the high southern latitudes'. The references to Staaten Land (Isla de los Estados) and the Isle of Desolation (Kerguelen) were records from the *Resolution* voyage, that from Tierra del Fuego probably referred to the *Endeavour* specimen drawn by Parkinson and described by Solander. Gmelin's (1789) name was based on several earlier literary accounts including Latham, J. G. Forster (1777), and Hawkesworth (1773). Several of these are linked with the *Endeavour* material which thus has some type standing.

18.(**1**:18) *Macronectes giganteus* (Gmelin, 1789) Procellariidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson. [pencil] Procellaria gigantea β'; *v.* [pencil] 'Mem. the feet are Gray:/[ink] Decr. 23. 1768/[pencil] 5 Procellaria gigantea'. 294 × 480.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.75 'Pelago Atlantico Americam australem . . . Lat 37°S' (December 22, 1768). Dryander – Catalogue f.61. Sketch with colours, a solid line under the previous entry to indicate identical nature of this drawing.

NOTES: listed by Lysaght (1959:275) and Sharpe (1906:175).

19.(**1**:19) *Procellaria aequinoctialis aequinoctialis* Linnaeus, 1758 Procellariidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] '19 Procellaria fuliginosa/[ink] Feb 2nd 1769 Lat. 58'. 295 × 477.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.77 reported from two localities, Oceano Antarctico Terra del Fuego S Lat 58° (Feb. 2, 1769) and Oceano Aust. (Pacifico) Lat 44°35′ Long 109°2′ 23 Feb. 1769. Dryander – Catalogue f.61 as sketch without colour, P. fuliginosa Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:275) and Sharpe (1906:175). This drawing was referred to by Kuhl (1820) who also saw a specimen in the British Museum.

20.(**1**:20) *Pterodroma incerta* (Schlegel, 1863) Procellariidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Procellaria/1/3 ?/[ink] S. Parkinson'; *v.* [pencil] 'Mem. the beak is black the legs & upper part of the feet/ palid white the lower part where mark'd off dark brown/the Claws black the under part of the whole bird is white./[ink] Decr. 23.1768/[pencil] N°4 Procellaria sandaleata'. 260 × 369.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.89 locality given as Habitat in oceano America australis. Lat.37°S (Dec. 22, 1768). Dryander – Catalogue f.61 as sketch with colours P. sandaliata Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:275) and Sharpe (1906:175). Lysaght said that it had been suggested, without giving any source, that two species were involved in Solander's description and the drawing but this is unlikely since only one date and locality are given in both drawing annotation and manuscript.

21.(**1**:21) *Pterodroma inexpectata* (Forster, 1844) Procellariidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The Bill intirely black the iris of the eye brown pupil black./15 Procellaria [antarctica – deleted] lugens [substituted]/[ink] Feb. 1st 1769 Lat 59:00'. 300 × 478.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.91 reported from two localities oceano Antarctico, Terra del Fuego australi. Lat.59°S Long —W (Feb.1, 1769), and Oceano Australi. Lat.36°49′S, Long. 111°30′W (March 3, 1769). Dryander – Catalogue f.61 as sketch without colours, P. lugens Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:276) and Sharpe (1906:176). Kuhl (1820) referred to the two drawings (nos 21 and 22) in Banks's collection under *Procellaria lugens* in the synonymy of his *P. grisea* L.

22.(**1**:22) *Pterodroma inexpectata* (Forster, 1844) Procellariidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak black the legs & that part of the foot next them dirty white the remainder black./15 Procellaria [antarctica – deleted] lugens [substituted]/Sketch made by mistake/ [ink] Febry. 3d. 1769 Lat.57 30'.' 295 × 476.

MANUSCRIPT: see above no.21.

NOTES: listed by Lysaght (1959:276) and Sharpe (1906:176).

23.(**1**:23) *Puffinus griseus* (Gmelin, 1789) Procellariidae

DRAWING: unfinished pencil of whole bird and details; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak fuscus the lower mandible paler & blueish the feet of the same colour./23 Nectris fuliginosus/[ink] Feb.15. 1769 Lat.48:27″ Long :93″. 263 × 368.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.77, with reference to two captures Oceano Antarctico, Terra del Fuego S Lat 58° (Feb. 2, 1769), in Oceano aust. (Pacifico) Lat 44°35′ Long 109°2′ (23 Feb. 1769); Parkinson's drawing seems to refer to neither of these. Dryander – Catalogue f.61 as sketch without colours P. fuliginosa Mss —— Oc., S. Parkinson; it was also listed under *Nectris* on f.65.

NOTES: listed by Lysaght (1959:276) and Sharpe (1906:176). This drawing, but not Solander's manuscript, was referred to by Kuhl (1820) who published the name *Procellaria fuliginosa*. Gmelin (1789) referred to Cook's account of the Dark grey

Fig. 4 *Puffinus griseus* (Gmelin, 1789). Parkinson's drawing was referred to by H. Kuhl (1820) and was the basis of his name *Procellaria fuliginosa*. (Catalogue number 23.)

Petrel and to Latham (1785) probably deriving the former reference from Latham who described a specimen in the Leverian Museum.

24.(**1**:24) *Puffinus assimilis elegans* Giglioli & Salvadori, 1869 Procellariidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak blue grey towards the back & the point black the legs & feet the same colour/as in Procellaria cyanopeda./24 Nectris munda/[ink] Feb.15. 1769 Lat.48.27′ Long. 93'. 270 × 367.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.115 as Oceano Australi, Lat. 48°27′ S, Long. 93° W (Feb.15, 1769), Lat. 35°8′ S, Long. 188°30′ W (Jan 6, 1770); the first specimen was clearly the one drawn. Dryander – Catalogue f.65 as sketch without colours N. munda Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:276) and Sharpe (1906:176). The drawing was referred to by Kuhl (1820) and is the sole type material of his species *Procellaria munda* (he erroneously gave the date as 25 February). The Parkinson drawing was

described by Bourne (1959) who pointed out that *P. munda* Kuhl, 1820 had been declared a *nomen rejectum* by the International Commission on Zoological Nomenclature. The name is included as an unavailable name under the subspecies *Puffinus assimilis elegans* by Peters (1979).

25.(**1**:25) *Diomedea exulans* Linnaeus, 1758 Diomedeidae

DRAWING: unfinished water colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The face & throat white as mark'd of on the figure the whole body above & [below – faintly deleted] fusca pallida the belly/the feet whitish w^{t} a cast of blue & the nails white./ [ink] Dec^{r}. 23^{d}. 1768/Lat.37. South/[pencil] N^{o}. 9 Diomedea exulans'. 295 × 480.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.3 from Americam australem ubi Latit XXXVII circiter 100 Leucas nauticas a litore captus (Dec.23 1768) . . . (Mar 3 1769); (D. & W. 45) S.C. Aves f.151 – same dates, and for D. exulans var (f.157) 3 Feb. 1769 and (f.159) 2 Oct. 1769, 6 Jan. 1770, 11 Apr. 1770. Dryander – Catalogue f.65 as sketch with colours D. exulans L. —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:277) and Sharpe (1906:176). Latham (1785) in his account of the size of the wandering albatross referred to a wing-span of twelve feet recorded 'in a manuscript at Sir Joseph Banks's'. He also mentioned specimens in the British and Leverian Museums, but there is no evidence that these were first voyage specimens. The wing-spans in the Slip Catalogue are 9 feet (f.152v), 10 feet 1 inch (f.158v), 10 feet 7 inches (f.159v) and 6 feet 11 inches (f.161v); the weight of the first was given as 12 pounds which Latham may have mis-read as the wing-span.

26.(**1**:26) *Phoebetria palpebrata* (Forster, 1785) Diomedeidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The bill intirely black, the iris of the eyes a yellow Brown the pupil black the skin that goes along the beak from the head/pale violet, clouded w^{t} pale brown./13 Diomedia antarctica/ [ink] Feb. 1st 1760. Lat.59'. 296 × 475.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.9 from Terra del Fuego. 59°S (Feb,1,1769); (D. & W. 45) S.C. Aves f.160 with same data. Dryander – Catalogue f.65 as sketch without colours D. antarctica Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:277) and Sharpe (1906:176). Forster's (1785) description was based on a specimen obtained at 47°S. between 5 December 1772 and 13 January 1773 on the *Resolution* (Forster, 1844); a figure is in the G. Forster collection of drawings. Latham (1785) referred both to Forster's voyage (Forster, J.G., 1777) and Cook's published account (Hawkesworth, 1773) but appears to have derived most of his information about the Sooty Albatross from Forster. Latham's account was referred to by Gmelin (1789) who also quoted the Forster and Cook references, perhaps taking them from Latham, for his description of *Diomedia fuliginosa*.

27.(**1**:27) *Diomedea chrysostoma* Forster, 1785 Diomedeidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak black excepting the back of the upper mandible & part of the under one which is a dirty greenish white./21 Diomedia profusa/[ink] Feb^{ry} 3^{d} 1769 Lat.57:30'. 297 × 476.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.11 from Terra del Fuego, 58°31′ S (Feb.3, 1769), and 48°27′ S (Feb.15, 1769); (D. & W. 45) S.C. Aves f. 162 with same data. Dryander – Catalogue f.65 as sketch without colours D. profusa Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:277) and Sharpe (1906:176–7). Latham (1785) described the Yellow-nosed Albatross from a specimen taken off the Cape of Good Hope in the British Museum, but mentions the species occurring in the southern hemisphere all round the pole from 30 to 60 degrees and then specifies one 'caught in lat. 57.30.S. in the month of February'. This suggests that Latham had taken these data from the Parkinson drawing, and not from Solander's manuscripts.

28.(**1**:28) *Fregata magnificens* Mathews, 1914 Fregatidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'the Beak is of a lead colour whitish towards the base of/the upper mandible the bag is of a dirty Orange the feathers of the whole body is quite black having a/ cast of Purple on the back the feet & Claws lead Colour./To be colord from/N° in Cag N°. / Pelecanus Aquilus JB/Specimen lost N° 3/[ink] Rio Janeiro'. 295 × 480.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.19 from America meridionali; (D. & W. 45) S.C. Aves f.168, as Pelecanus Aquilus var., same data. Dryander – Catalogue f.67 as sketch without colour P. Aquilus L. —— Bras., S. Parkinson.

NOTES: listed by Lysaght (1959:277) and Sharpe (1906:177).

29.(**1**:29) *Phalacrocorax albiventer* (Lesson, 1831) Phalacrocoracidae

DRAWING: finished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak & all the bare part around the eye is a brownish grey – the point only excepted which is whitish/the iris of the eyes grey pupil black the feet something reddish./N° 11 Pelecanus antarcticus/[ink] Terra del Fuego'. 290 × 480.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.15 from Terra del Fuego & adhuc australius; (D. & W. 45) S.C. Aves f.170 – same data. Dryander – Catalogue f.67 as sketch without colours, P. antarcticus Mss —— T.d.F., S. Parkinson.

NOTES: listed by Lysaght (1959:277) and Sharpe (1906:177).

30.(**1**:30) *Sula serrator* G. R. Gray, 1845 Sulidae

DRAWING: partly coloured pencil sketch; *r.* [ink] 'S. Parkinson'; *v.* [pencil] '1. Pelecanus sectator/[ink] Aehie ne Mauwe'. 295 × 475.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.17, habitat Oceano Australiam septentrionalem 36°–33° S, 185°–187° W, Dec.24, 1769; (D. & W. 45) S.C. Aves f.171 – same data. Dryander – Catalogue f.67 as sketch without colour, P. Bassanus L. —— N.Z., S. Parkinson.

NOTES: listed by Lysaght (1959:278) and Sharpe (1906:177) who gave the name on the annotation as *Pelecanus serrator*. The Dryander entry must refer to this drawing as it is the only *Pelecanus* sketched by Parkinson in New Zealand. Gray's (1845) original description cited the Parkinson drawing as *Pelecanus serrator*, Banks, Icon. ined. 30, and appears to have derived the name for the species from a misreading of Solander's manuscript name.

31.(**1**:31) *Phaethon rubricauda melanorhynchos* Gmelin, 1789 Phaethontidae

DRAWING: signed water-colour of bird in flight: *r.* [ink] 'Phaeton erubescent/ Sydney Parkinson pinx^{t} 1769/[pencil] Tawai'; *v.* [none]. 290 × 315.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.29, locality given as Oceano australi ca Otaheite & Nigus, March 21, 1769; (D. & W. 45) S.C. Aves f.181–184v. same data. Vernacular name in both mss Tavai 'Otaheitensibus'. Dryander – Catalogue f.69 as finished in colour P. erubescens Mss —— Oc., S. Parkinson and sketch with colour — caput — .

NOTES: listed by Lysaght (1959:278) and Sharpe (1906:177). Latham (1785) described the Black-billed Tropic Bird from a specimen in Sir Joseph Banks's possession and gave as localities for the species 'Turtle and Palmerston Islands, in the South Seas'. Gmelin (1789) based his *Phaeton melanorhynchos* solely on Latham's account. G. R. Gray (1844) cited the Parkinson drawing and probably from it Solander's manuscript name as 'P. erubescens Banks, Icon. ined. t.31.' in his synonymy of the Red-tailed Tropic Bird.

32.(**1**:31) *Phaethon rubricauda melanorhynchos* Gmelin, 1789 Phaethontidae

DRAWING: finished water-colour of bird's head; *r.* [pencil] 'on the same Paper with the Bird'. *v.* [none]. 159 × 285.

MANUSCRIPT: see no.31.

33.(**1**:32) *Larus maculipennis* Lichtenstein, 1823 Laridae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The beak & feet the col^{r} of minium – the breast & belly white w^{t} a cast of red the same as in the Cocatoo w^{t} the red crest/the claws dark brown – the length of the Wing in the natural size 11 inches/16 Larus gregarius/[ink] Terra del Fuego'. 265 × 364.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.35, locality given as Terra del Fuego; (D. & W. 45) S.C. Aves f.190, same data. Dryander – Catalogue f.69 as sketch without colour, L. gregarius Mss —— T.d.F., S. Parkinson.

NOTES: listed by Lysaght (1959:278) and Sharpe (1906:177–8); the latter quoted from Solander's manuscript notes.

34.(**1**:33) *Gygis alba candida* Gmelin, 1789 Laridae

DRAWING: pencil sketch; *r.* [ink] 'S. Parkinson/[pencil] Epérai'; *v.* [pencil] 'The whole bird intirely white the beak a lead colour, as are also the toes, the webs between white/the Rachi of the wing feathers pale brown & those of the tail black/ N°. 2. Egg Bird/[ink] Otahite'. 265 × 365.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.101, locality given as Otahaensibus, Oceano Pacifico . . . Insulam Otahe (July 28, 1769); (D. & W. 45) S.C. Aves f.210, same data. Dryander – Catalogue f.71 as sketch without colour, Sterna – Ot., S. Parkinson. (See notes.)

NOTES: listed by Lysaght (1959:278) and Sharpe (1906:178). This drawing has not previously been associated with any bird described in the Solander manuscripts. It is unquestionably a tern and was listed by Dryander as *Sterna* sp. from Tahiti. The only *Sterna* described from Tahiti was Sterna nigripes (see references quoted above) details of which appear to agree with the notes on coloration in the annotation. The specimen of Sterna nigripes was preserved in Cagg No 6 as bird specimen A 20.

Gmelin's (1789) *Sterna candida* was solely based on Latham's (1785) account of the White Tern which described a specimen in the Leverian Museum, although the locality given for the species was Christmas Island 'and other parts of the South Seas. Seen also off the island of St. Helena'. Latham must have derived this information from several sources although he cites no literature. Christmas Island in the Line Islands was visited on Cook's third voyage December 1777–January 1778.

35.(**1**:34) *Ptilinopus purpuratus* (Gmelin, 1789) Columbidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Columba porphyraea Forster/purpurata S.N. XII:784. n.64/Oopāa'; *v.* [pencil] 'N°. 4. Green dove/[ink] Otahite'. 366 × 265.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.89 – two identical entries refer to sketches with colour within *Columba* from Otaheiti and relate to this drawing and no.36.

NOTES: listed by Lysaght (1959:278) and Sharpe (1906:178). Gmelin's name was based solely on the description of the Purple-crowned Pigeon in Latham (1783). This was described from a specimen from Otaheite in the Leverian Museum. Latham records the Tahitian vernacular name as Oopa or Oopara; he also describes variation in plumage in his Purple-crowned Pigeon in specimens or descriptions from Uliatea (Raiatea) and Tonga Taboo (Tongatabu, Friendly Islands).

36.(**1**:35) *Gallicolumba erythroptera* (Gmelin, 1789) Columbidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Latham 2. p.624. n.13./Columba erythroptera S.N. XIII:775. p.10./Amāhò/amehò/[ink] S. Parkinson'/[colouring directions written on the drawing]; *v.* [pencil] 'the red on the neck brighter some of a fine shiny purple/No 1 Columba pectoralis/[ink] Otahite'. 265 × 360.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. Aves f.1 (261) as Columba

pectoralis with reference to the drawing. Dryander – Catalogue f.89 (see entry for no.35).

NOTES: listed by Lysaght (1959:278) and Sharpe (1906:178). Gmelin's name was based solely on Latham's description of the Garnet-winged Pigeon (Latham, 1783); he recognized three varieties, α from the island of Eimeo (Moorea), β from Tahiti, and γ from Tanna, New Hebrides. These three localities all derive from Latham's (1783) account in which he reported that the Otaheite specimen was at Sir Joseph Banks's, while the Eimeo specimen (collected on Cook's third voyage) was in the Leverian Museum. The three varieties differed in details of plumage and size. This species is now extinct in the Society Islands (Lysaght, 1959).

37.(**1**:36) *Ramphocelus bresilius* (Linnaeus, 1766) Emberizidae

DRAWING: pencil sketch with colour; *r.* [ink] 'S. Parkinson/[pencil] Loxia mexicana'; *v.* [pencil] 'The whole wings & tail black a little inclining to brown the feathers of the/Back at their bases are black & their edges scarlet which makes it/ look darker than the scarlet of the Belly – is more yellow than the rest./the legs fusca the beak black excepting the oblong space mark'd of/on the base of the under mandible which is white. N°1 Preserved dry in Box N° /[ink] Rio Janeiro'. 295 × 239.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.95 as sketch with colours, L. mexicana L. n.7 —— Bras., S. Parkinson.

NOTES: listed by Lysaght (1959:279) and Sharpe (1906:178). *Loxia mexicana* dates from Linnaeus (1758).

38.(**1**:36) *Turdus falcklandi magellanicus* P. P. King, 1830 Muscicapidae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N° 11 Turdus/ [ink] Terra del Fuego'. 295 × 239.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.91 listed as sketch without colour, T. —— T.d.F., S. Parkinson.

NOTES: listed by Lysaght (1959:279) and Sharpe (1906:178).

39.(**1**:37*a*) *Sporophila caerulescens* (Vieillot, 1817) Emberizidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N° 2/ Cagg N° / Rio de Janeiro'. 293 × 238.

MANUSCRIPT: Solander – none. Dryander – Catalogue, not identifiable.

NOTES: listed by Lysaght (1959:279) and Sharpe (1906:178).

40.(**1**:37*b*) *Volatina jacarina* (Linnaeus, 1766) Emberizidae

DRAWING: finished water-colour, signed; *r.* [ink] 'Loxia nitens/Sydney Parkinson pinx^{t} ad vivum 1768/Brasil'; *v.* [ink] 'of the Coast of Brasil/Nov^{r}. 8th. 1768'. 292 × 237.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f. 119, locality given as 'in Brasilia australi'; (D. & W. 45) S.C. Aves f. 267, same data. Dryander – Catalogue f. 95 as finished in colours, L. nitens Mss —— Bras., S. Parkinson.

NOTES: listed by Lysaght (1959:279) and Sharpe (1906:179).

41.(**1**:38*a*) *Motacilla flava* Linnaeus, 1758 Motacillidae

DRAWING: finished water-colour, signed; *r.* [ink] 'Motacilla avida/Sydney Parkinson pinxt 1768'; *v.* [ink] 'Sep^{tr}. 28. 1768/Lat. 19.00 – north'. 214 × 270.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f. 121 as 'Habitat in Africa qua in mari Atlantico (Lat 19 N) African . . . (Sept 28, 1768)'; (D. & W. 45) S.C. Aves f. 275, same data. Dryander – Catalogue f. 103 as finished in colours, M. avida Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:279) and Sharpe (1906:179).

42.(**1**:38*b*) *Oenanthe oenanthe* (Linnaeus, 1758) Muscicapidae

DRAWING: finished water-colour, signed; *r.* [ink] 'Motacilla velificans./Sydney Parkinson pinxt ad vivum 1768 Sept./T. 10. P. 6. Sept. 4. 1768./[pencil] Oenanthe'; *v.* [ink] 'of the Coast of Spain'. 273 × 239.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f. 123 as from Europe australiore prope litora Gallicia Hispanorum in Nave capta Sept. 3 1768; (D. & W. 45) S.C. Aves f. 277, same data. Dryander – Catalogue f. 103 as finished in colour, M. velificans Mss —— Oc., S. Parkinson.

NOTES: listed by Lysaght (1959:279) and Sharpe (1906:179).

43.(**1**:39) *Chelonia mydas* (Linnaeus, 1758) Cheloniidae

DRAWING: unfinished pencil sketch, dorsal view; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'Testudo Mydas/[ink] Endeavours River'. 266 × 371.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f. 125 Novam Hollandium male and female, with vernacular names for both from Australia, and for the species from the islands of the Pacific; (D. & W. 45) S.C. Amphibia 1, f. 14, same data; (D. & W. 40d) A.J.C. f. 3 (303) Princes Island and vernacular. Dryander – Catalogue f. 109 as sketch without colours T. Midas L. superne —— N.C., S. Parkinson.

NOTES: clearly only the descriptions made in Australia (Nova Hollandia, or Nova Cambria in Dryander's Catalogue) refer to the Endeavour River specimens. The reports from the Pacific islands and Princes Island were either a result of communication with the natives, or of native fishing. Despite this being a well-known species described by Linnaeus mainly from carapaces, Solander gave a moderately detailed account and described them copulating in July and August.

Dr E. N. Arnold (personal communication) points out that the drawing is not sufficiently detailed for critical distinction from *Chelonia depressa*, but *C. mydas* is the more probable species.

44.(**1**:40) *Chelonia mydas* (Linnaeus, 1758) Cheloniidae

DRAWING: unfinished pencil sketch, ventral view; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'Testudo Mydas/[ink] Endeavours River'. 268 × 370.

MANUSCRIPT: see above no.43; Dryander – Catalogue f.109 as sketch without colours T. Midas L. inferne —— N.C., S. Parkinson.

NOTES: see above no.43.

45.(**1**:41) *Caretta caretta* (Linnaeus, 1758) Cheloniidae

DRAWING: unfinished pencil sketch, dorsal view; *r.* [ink] 'S. Parkinson'; *v.* [ink] 'Decr. 23 1768/Lat.37. South/[pencil] Nº 1 Testudo Caretta'. 262 × 365.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.127 same details as above 'supra aquam domiens, capta . . . circiter milliaria nautica a litore'; (D. & W. 45) S.C. Amphibia 1 f.16, same data, the carapace length given as 25 inches. Dryander – Catalogue f.109 as sketch without colours T. Caretta L. superne —— Oc., S. Parkinson.

NOTES: this specimen of the loggerhead turtle caught off Brazil was drawn by Parkinson from the ventral and lateral views (see below). Dryander's Catalogue lists each drawing distinguishing them as 'inferne' and 'a latere visa' respectively.

46.(**1**:42) *Caretta caretta* (Linnaeus, 1758) Cheloniidae

DRAWING: unfinished pencil sketch, ventral view; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'No.1 Testudo Caretta/Decr. 23d. 1768. Lat.37.S./Nº 10 Testudo Caretta/Decr. 23. 1768/Lat.37. South'. 263 × 372.

MANUSCRIPT: see above, no.45.

NOTES: see above, no.45.

47.(**1**:43) *Caretta caretta* (Linnaeus, 1758) Cheloniidae

DRAWING: unfinished pencil sketch, side view; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'Nº 10/[ink] Decr. 23/Lat.37. South/[pencil] Nº 1 Testudo Caretta'. 262 × 369.

MANUSCRIPT: see above, no.45.

NOTES: see above, no.45.

48.(**1**:44) *Raja nasuta* Müller & Henle, 1841 Rajidae

DRAWING: pencil sketch; *r.* [pencil] 'Raja oxyrinchus L. ?/[ink] S. Parkinson'; *v.* [pencil] 'Clay colour with the edges of the body finns up to the nose ting'd with red./21. Raia nasuta/[ink] Totarra'nue'. 475 × 300.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.135, from Oceano Australiam . . . Totaranui; (D. & W. 45) S.C. Amphibia 1, f.153–154, same data. Dryander – Catalogue f.119 as sketch without colour R. oxyrinchus L? —— N.Z., S. Parkinson.

NOTES: Müller & Henle (1841) based their description solely on this drawing which they attribute to Banks MS 44, from Südsee, but make no reference to Solander's manuscripts. This drawing therefore has type status. Günther (1870) reproduced Solander's manuscript description in full but could not then find Parkinson's drawing (possibly because it was concealed in volume 1 with other Linnaean 'Amphibia'), although as he commented, the drawing had been seen by Richardson (1843*a*) who cited the locality, Totaeranue, volume and folio number. The drawing was reproduced by Whitehead (1968) with annotations transcribed. The length of the drawing, i.e. the pencil image, was given as 345 mm, which unfortunately was assumed by Garrick & Paul (1974) to be the length of the specimen. Although many of the *Endeavour* (and *Resolution*) fishes were drawn at life size, it would be a dangerous assumption to assume that all were, especially such potentially large animals as rays, skates, and sharks. Garrick & Paul describe *Raja nasuta*, known as the 'rough skate in New Zealand' as the most common skate on the North Island continental shelf.

49.(**1**:45) *Aptychotrema banksii* (Müller & Henle, 1841) Rhinobatidae

DRAWING: finished pencil dorsal view and detail of ventral side of head by H. D. Spöring; *r.* [pencil] 'RAJA rostrata/rostrata deleted/Rhinobatos L. ?'; *v.* [pencil] 'Rhinobates (Rhinobates) Banksii Müller und Henle'. 426 × 358.

MANUSCRIPT: Solander – (D. & W. 40) P.N.H. f.3 (85), locality not given, date 29. April 1770; (D. & W. 45), S.C. Amphibia 1, f.162, 'Habitat in Oceano Pacifico Novae Hollandia JB & DS'. (and Oceano Jamaicensis Shakespear). Dryander – Catalogue f.119 as finished without colour R. rhinobatos L. ? —— N.C., Spöring.

NOTES: Solander's manuscript (D. & W. 45) S.C. Amphibia 1, folio 162 is a post-voyage entry as it records Raja rostrata from the *Endeavour* voyage, with the reference 'Fig. Pict.' to this drawing, and then continues to include the reference to the specimen from Shakespear's collection from Jamaica with an MB indicating a specimen was in the British Museum. This presumably referred to a specimen of *Rhinobatos* from the Caribbean.

This drawing was referred to by Müller & Henle (1841) (referring to Banks MS. 45) with the locality at Neuholland; this is the sole reference for typification of the species. From the annotations on the drawing it can be seen that no locality was given, nor did Solander's manuscript account (P.N.F. f.3) although from its inclusion in this part of the manuscript (Pisces Novae Hollandiae) it clearly came from Australia (= New Holland in Banks and Solander usage, or N.C., Novae Cambria, of Dryander's *Catalogue*). The date given by Solander (29 April 1770) shows that this fish was captured in Botany Bay, New South Wales (Groves, 1962). Why Richardson (1843*a*) should have included this species in a list of New Zealand fishes is unknown, except perhaps that he may, as Garrick & Paul (1971) suggest, have misread Müller & Henle's Neuholland for New Zealand. Richardson (1843*a*) did not, however, simply copy the reference from Müller & Henle, who refer to the drawing as Banks MS 45, for he specifically cited Banks, fig. pict. 1 p.45, thus drawing attention to the drawing in the first volume, and elsewhere (Richardson,

1843*b*) he referred to the drawing as Parkinson 1, t.45. However, there is no locality on the drawing and this must have misled Richardson, although plainly he did not refer to the Solander manuscripts for these are clearly localized. Garrick & Paul (1971) have recently removed this taxon from the New Zealand faunal list.

This drawing was reproduced by Whitehead (1968).

A specimen given by Banks to Broussonet and now in the Muséum National d'Histoire Naturelle, Paris and believed to be from Australia, is not considered to be the original for this drawing on account of disparity in length (drawing length 465 mm, specimen 205 mm) (Bauchot, 1969).

50.(**1**:46) *Urolophus testaceus* (Müller & Henle, 1841) Dasyatidae

DRAWING: finished pencil dorsal view and detail of ventral side of head by H. D. Spöring; *r.* [pencil] 'RAJA testacea/N.B. the 200^{d} pounder wanted the upper fin on the extremity of/the tail, & the small fin near the stings, the head . . .'/[last line trimmed off]; *v.* [pencil] 'Trygonoptera testacea Müller und Henle'. 526 × 360.

MANUSCRIPT: Solander – (D. & W. 40) P.N.H. f.3 (85) locality not given; date 30 April 1770. Dryander – Catalogue f.119, presumably one of three finished drawings without colour of Raja —— N. C., Spöring (the others being nos. 51 and 52).

NOTES: Müller & Henle (1841) used this drawing as the sole source of *Trygonoptera testacea*, citing it as 'Banks. MS. 46'; they did not, however, apparently cite Solander's manuscript description. The drawing was again referred to as 'Parkinson, 1.t.146 (*sic*)' by Richardson (1843*b*), and again mistakenly associating the drawing with New Zealand whereas the fish was captured on 30 April 1770 in 'Sting Ray's Bay', later Botany Bay, New South Wales. This drawing was reproduced by Whitehead (1968).

According to Whitley (1940) *Urolophus testaceus* grows to only 30 inches (76 cm) in length; the note referring to another specimen of 200 pounds weight could not have referred to this species (as the note of its lacking the caudal and dorsal fins confirms). This and the other large sting rays caught in Botany Bay in May 1770 were referred to *Bathytoshia brevicaudata* (Hutton, 1875) by Whitley (1940) (= *Dasyatis brevicaudata*, of authors).

51.(**1**:47) *Trygonorhina fasciata* Müller & Henle, 1841 Rhinobatidae

DRAWING: finished pencil dorsal view, details of ventral side of head by H. D. Spöring; *r.* [pencil] 'RAJA fasciata/Long. 2 ped: 1½ unicas'; *v.* [pencil] 'Trygonorhina fasciata Müller und Henle'. 525 × 360.

MANUSCRIPT: Solander – (D. & W. 40) P.N.H. f.2 locality not given, date 29 April 1770. Dryander – Catalogue f.119, presumably one of three finished drawings without colour of Raja —— N.C., Spöring (the others being nos. 50 and 52).

Fig. 5 *Trygonorhina fasciata* Müller & Henle, 1841. Drawing by Spöring of a fish caught on 29 April 1770 at Sting Ray Bay (later Botany Bay), Australia. (Catalogue number 51.)

NOTES: *Trygonorhina fasciata* was based by Müller & Henle partly on this drawing, cited as Banks. MS.47, but also on a Quoy & Gaimard specimen in alcohol in the Paris Museum (cf. Garrick & Paul (1971) who claim that the species name was based solely on Banks's drawing). The locality given by Müller & Henle was

Neuholland. Despite this Richardson (1843*a*; 1843*b*) included this taxon in his list of New Zealand fishes, on the first occasion citing it as Banks, fig. pict. 1, t.47 and the second as Parkinson, i.t.47. It is possible that Richardson assumed that this fish came from New Zealand as no locality was given on the drawing, but he clearly did not refer to Solander's manuscript entitled *Pisces Novae Hollandiae* (= Australia) or the date 29 April 1770, when the *Endeavour* had just arrived at Botany Bay. Garrick & Paul (1971) have recently removed this fish from the Zealand fauna list.

This drawing was reproduced by Whitehead (1968).

52.(**1**:48) *Myliobatis australis* Macleay, 1881 Myliobatidae

DRAWING: finished pencil dorsal view, details of ventral and lateral views of head by H. D. Spöring; *r.* [pencil] 'RAJA/macrocephala/Willugh. app. tab. 10. f. 3/Long 4 pedum'; *v.* [pencil] 'Myliobates Nieuhofi Müller und Henle/[ink] Botany Bay'. 528 × 359.

MANUSCRIPT: Solander – none; Dryander – Catalogue f. 119, presumed to be one of three finished drawings without colour of Raja —— N.C., Spöring (the others being nos. 50 and 51).

NOTES: this drawing was cited by Müller & Henle (1841) as *Myliobatis Nieuhofi*, with a reference to Banks. MS.48; their annotation appears on the verso. Richardson (1843*a*, 1843*b*) includes *M. nieuhofi* (Bloch & Schneider, 1801) in the New Zealand fauna apparently on the Müller & Henle reference but citing Raia macrocephala, Banks, fig. pict. 1, t.48 (Richardson, 1843*a*). The reference to Willughby in the annotations is to Willughby (1686) whose description, derived from Nieuhof, formed the sole basis for Bloch & Schneider's (1801) name.

53.(**1**:49) *Prionace glauca* (Linnaeus, 1758) Carcharhinidae

DRAWING: finished water-colour, lateral view; *r.* [ink] 'Squalus glaucus./Sydney Parkinson pinx^{t}: 1769./mow otaa'; *v.* [ink] 'April 10. 1769. off Osnabrugh Island South Sea'. 292 × 466.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f. 187 (171) from Oceano australis . . . Osnabrugh Island, captus April 10, 1769, Lat. 17°, Length 6 ft 7 in; (D. & W. 45) S.C. Amphibia 1, ff. 211–217, with same data. Dryander – Catalogue f. 121 as finished in colours S. glaucus L. e latere —— Oc., S. Parkinson.

NOTES: Solander's manuscript notes in the Slip Catalogue (D. & W. 45) exist in several states. The pencil notes on ff. 216 (two leaves) are bound in reverse order, and may be presumed to be the original notes; the last page is in ink and contains detailed measurements. The measurements are repeated in ink in fair copy on f. 217. A formally arranged description appears on ff. 214–215 (four pages), and a short diagnosis and citation of Linnaeus's account in Solander's hand appears on f. 213. The specimen was dissected, and Solander gives details of internal anatomy. The internal helminth parasite Fasciola tenacissima Solander, described on 11 April, came from this fish, see no. 239.

Osnabrugh Island is now known as Mururoa, and lies south of the Tuamotu group.

54.(**1**:50) *Prionace glauca* (Linnaeus, 1758) Carcharhinidae

DRAWING: finished pencil, ink and wash dorsal view and pencil detail of underside of head; *r.* [ink] 'Squalus glaucus./Sydney Parkinson pinx^{t}. 1769'; *v.* [pencil] 'Squalus glaucus/[ink] April 10. 1769. off Osnabrugh Island South Sea/[pencil] The back pretty low. P.B. shaded towards the top w^{t} indian ink & D^{0} gradually/ running into the belly which is silvery lightly ting'd w^{t} red the eye clouded w^{t} black-grey the circle white ting'd wt blue'. 472 × 290.

MANUSCRIPT: Solander – see above no. 53. Dryander – Catalogue f. 121 as finished without colour, S. glaucus L. a tergo —— Oc., S. Parkinson.

NOTES: see no. 53.

55.(**1**:51) *Carcharhinus* sp. Carcharhinidae

DRAWING: finished water-colour oblique view of back of shark; details of eyes; *r.* [ink] 'Squalus carchadius./Sydney Parkinson pinx^{t} 1768/mow'; *v.* [none]. 296 × 472.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Amphibia 1 ff. 206–209, no locality or date given, specimen was 5 feet 4 inches long; (D. & W. 42) C.S.D. f. 177 (159) repeats the Slip Catalogue entry. Dryander – Catalogue f. 121 as finished in colours Squalus Carcharias L. e latere —— Oc., S. Parkinson.

NOTES: Parkinson's mis-spelling of the species name must have been due to misreading a written text ('dius' for 'rias'). Solander identified this shark with *Squalus carcharias* Linnaeus, 1758, the present *Carcharodon carcharias*, but there was much confusion in the eighteenth century with carcharhinid sharks and *Carcharodon*. Solander's manuscript notes exist in two states in the Slip Catalogue (D. & W. 45); f. 209 is a large folded sheet mostly written in pencil which must be his first draft notes. They are neatly transcribed at ff. 207–208 (four pages) and f. 206 is a diagnosis with reference to Linnaeus (1766) in Solander's hand.

56.(**1**:52) *Squalus lebruni* (Vaillant, 1888) Squalidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sq. acanthias ?/[ink] S. Parkinson'; *v.* [pencil] '17 Squalus maculatus/[ink] Aehie no Mauwe'. 292 × 467.

MANUSCRIPT: Solander – [none]. Dryander – Catalogue f. 121 as sketch with colours S. Acanthias ? – N.Z., S. Parkinson.

NOTES: the verso of this drawing has an unlabelled pencil outline of *Parapercis colias* (Schneider, 1801), which is cancelled by two oblique lines. The name *Acanthias maculatus* was published by Richardson (1843*a*, 1843*b*) attributed to *Squalus maculatus* Parkinson, fig. pict. 1, f. 52 (with slight variation between the two accounts). Fortunately, this name is preoccupied by *Squalus maculatus* Bloch & Schneider, 1801, otherwise it would predate *Squalus lebruni* Vaillant, 1888.

57.(**1**:53) *Cephaloscyllium isabella* (Bonnaterre, 1788) Scyliorhinidae

DRAWING: finished water-colour, dorsal view; *r.* [pencil] 'Isabella Broussonet/

[ink] S. Parkinson'; *v.* [pencil] '8 Squalus lima/[ink] Aehie no Mauwe'. 480 × 295.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Amphibia 1 ff.189–192, 'Habitat in Oceano Novam Zelandiam alluente . . . (Nov.24.1769)'; (D. & W. 42) C.S.D. f.167 (199), same details. Dryander – Catalogue f.121, probably third entry from bottom, sketch with colours Squalus —— N.Z., S. Parkinson.

NOTES: this drawing was examined by Broussonet (1780) in the 'collection de M. le Chevalier Banks', and Broussonet's description was compiled from manuscript notes provided by Solander. Broussonet, however, provided no binominal names for his account of the dogfishes, merely referring to this species as l'Isabelle'. The name was latinized as *Squalus isabella* by Bonnaterre (1788), and independently by Gmelin (1789), both of whom relied directly on Broussonet's description.

The Solander name *lima* was published by Richardson (1843*a*, 1843*b*) as *Scyllium ? lima*, with references to Parkinson's drawing and to Broussonet.

The drawing was reproduced by Whitehead (1968).

58.(**1**:54) *Carcharhinus* sp. Carcharhinidae

DRAWING: finished pencil and wash, viewed obliquely from in front, detail of underside of head in pencil; *r.* [ink] 'Squalus Carchadius'; v. [none]. 294 × 472.

MANUSCRIPT: see no.55. Dryander – Catalogue f.121 as finished without colour S. Carcharias L. a tergo —— Oc., S. Parkinson.

NOTES: see no.55.

59.(**1**:55) *Carcharhinus* sp. Carcharhinidae

DRAWING: finished pencil side view of shark, detail of underside of head by H. D. Spöring; *r.* [pencil] 'SQUALUS/Vulpecula./glaucus. vid. Phil. Trans. vol. 68 p789. fig./long. 3½ pedum.'; *v.* [ink] 'Botany Bay'. 358 × 525.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.157 (189), diagnosis only; (D. & W. 40) P.N.H. f.4 (86) 2 May 1770. Dryander – Catalogue f.121 probably the drawing referred to as finished without colour, Squalus —— N.C., Spöring.

NOTES: the reference in the annotations to the *Philosophical Transactions* relates to the paper by Watson (1779) in which he describes a stuffed blue shark (*Prionace glauca* (L., 1758)), then in the British Museum, but caught in shallow water on the coast of Devonshire. This is also the origin of the name :'glauca' in the annotation. This drawing is not referable to *Prionace glauca*.

The *Endeavour* was at Botany Bay on 2 May 1770 (Groves, 1962).

60.(**1**:56) *Hemiscyllium ocellatum* (Bonnaterre, 1788) Hemiscyllidae

DRAWING: finished pencil side view and underside of head by H. D. Spöring; *r.* [pencil] 'SQUALUS oculatus./Sporing [partly trimmed off]'; *v.* 'Endeavours river/Hemiscyllium ocellatum Muller und Henle'. 358 × 525.

MANUSCRIPT: Solander – (D. & W. 40) P.N.H. f.7 (89), as Squalus oculatus,

Australian Seas, Endeavour River, Careening place, 22 June 1770; length 2 feet 7 inches. Dryander – Catalogue [not listed].

NOTES: this small shark was first described by Broussonet (1784) in non-binominal form as 'l'oeillé' from a specimen two and a half feet long in the collection of Joseph Banks. He reported that 'elle a été pêchée au mois de Juillet, dans la mer du Sud, sur le côte de la nouvelle Hollande', which suggests either an error in transcription from Solander's manuscript, or the capture of another specimen which was unrecorded by Solander. Broussonet's account formed the basis for Bonnaterre's (1788) proposal of a formal name for the taxon. Independently, Gmelin (1789) also proposed the name *Squalus ocellatus* for this taxon, deriving his information from Broussonet.

Müller & Henle examined this drawing (the annotation *Hemiscyllium ocellatum* Muller und Henle is believed to have been written at the time of their visit because of the use of 'und'). They refer to a specimen of 2½ feet length in the British Museum collection at the time of their visit (before 1840). This strongly suggests that it was Banks's specimen which Broussonet described at the same length, and which in Solander's manuscript notes was described as '2 ped 7 unc' long.

Shaw (1793) described this shark, citing both Broussonet (1784) and Gmelin (1789), as 'a native of the Southern Seas', his illustration (pl. 161) was the first published of the species, and appears to have been made from a specimen, not copied from Spöring's drawing, as there are features in the engraving not visible on the drawing. This suggests that Shaw's illustration was made from the *Endeavour* specimen either in the British Museum or still in Banks's collection (the former seeming more probable). The presence of unnatural ridges by the branchial openings also suggests that the specimen was dry or stuffed. Three unlocalized stuffed specimens (f, g–h) of this species were in the British Museum collection in the late nineteenth century (Günther, 1870) but were described as half-grown, and were thus probably smaller than thirty inches in length, only one of these (specimen f) can now be found but is too small to be the *Endeavour* specimen.

A specimen from Broussonet's collection is still preserved in the Muséum National d'Histoire Naturelle, Paris (Bauchot, 1969) (MNHN – 1003); it is 355 mm in length. Although Bauchot explicitly and correctly stated it was not a type as it was not mentioned in the original description, Dingerkuss & De Fino (1983) have listed it as the holotype.

The drawing was reproduced by Whitehead (1968).

— (**1**:57) *Naso unicornis* (Forsskål, 1775) Acanthuridae

A drawing of *Naso unicornis* (Forsskål, 1775) by George Forster, labelled *r.* 'Chaetodon unicornis Anmi saw where', *v.* 'No 66 Balistoides Rhinoceros Otahite' was misbound in the *Endeavour* voyage drawings although it was clearly from the *Resolution* voyage. It was not listed by Whitehead (1978*b*) although the notes that he gives from the manuscript 'Catalogue of Forster drawings . . .' (his Cat. B) probably refer to this drawing and this species not to Forster f.194 *Harpurus monoceros*. In the bound volume of the *Endeavour* drawings this folio had been numbered 57.

61.(**1**:58*a*) *Rhinecanthus rectangulus* (Bloch & Schneider, 1801) Balistidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Balist. aculeatus/Ourèe Aăá/[ink] S. Parkinson'; *v.* [pencil] 'N° 41. Balistes angulatus/[ink] Otahite'. 254 × 318.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.57 (177) Balistes angulatus Fig.Pict. (Balistes aculeatus is described at f.41 (159)). Dryander – Catalogue f.123 as Balistes aculeatus L. —— Ot., S. Parkinson sketch with colours.

NOTES: the name Balistes angulatus was published in the synonymy of *B. rectangulus* by Richardson (1848) who quoted Solander's description and referred to Parkinson's drawing.

62.(**1**:58*b*) *Naso lituratus* (Bloch & Schneider, 1801) Acanthuridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Chaetodon harpuri mss varietas minor./Eoomai'; *v.* [pencil] 'N° 31 Balistoides olivaceus/a fish of this sort [indecipherable] the same, the yellow upon it inclining to green the blue on the back broader done with/Verditer the orange spots the breadth of the tail & very bright, a circle of white after the green of the/tail the P.A. was green near the body then brown then orange the black edged w^{t} white lips orange/[ink] Otahite'. 224 × 295.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.42 (160) as Balistoides olivaceus. Dryander – Catalogue f.145 as sketch with colours Chaetodon Harpurus var. Brouss. —— Soc. Isl., S. Parkinson.

NOTES: the name *olivaceus*, in the combination *Acanthurus olivacei* was used for another surgeon-fish from the *Resolution* voyage, described by Forster from Tahiti (Bloch & Schneider, 1801), but it was independently derived. The annotation Chaetodon harpuri mss varietas minor is presumed to have been written by Broussonet, or following his notes, and confirms the ascription in Dryander's Catalogue. Broussonet appears to have made a study of the 'Chaetodon' species (see Gmelin, 1789:1269).

63.(**1**:59) *Rhinecanthus aculeatus* (Linnaeus, 1758) Balistidae

DRAWING: finished water-colour; *r.* [pencil] 'Balist. aculeatus L./öidé/Oelh/oiwe tea/[ink] S. Parkinson'; *v.* [pencil] 'The colours on the back soften'd in the Orange & purple bright/N° 50 Balistes ornatus/[ink] Otahite.' 267 × 368.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.93 (213) as Balistes ornatus. Dryander – Catalogue f.123 probably one of the two drawings listed as sketch with colours B. aculeatus L. —— Ot., S. Parkinson.

NOTES: Solander's name Balistes ornatus was published by Richardson (1848) in the synonymy of his account of *Balistes aculeatus*. Richardson quoted Solander's description verbatim.

64.(**1**:60) *Melichthys vidua* (Richardson, 1845) Balistidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Aéheè tua/[ink] S. Parkinson'; *v.* [pencil] 'the whole body fusca black towards the tail & paler on the face & breast/ the iris of the eye olive pupil black./N° 29 Balistes vidua/[ink] Otahite'. 267 × 371.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.36 (154) as Balistes vidua. Dryander – Catalogue f. 123 as sketch with colours Balistes vidua Brouss. —— Ot., S. Parkinson.

NOTES: Richardson (1845) used Solander's name *Balistes vidua* properly attributing it to Solander's authorship and referring to this drawing as 'Parkinson in Bibl. Banks 1. No.60. 29'. He also cited George Forster's drawing ('Forster in Bibl. Banks. No.246') also from Tahiti. There is a specimen in the British Museum (Natural History) 1972.8.16.1. which Günther (1870) described as 'Adult: bleached. Otaheiti. Old Collection. Probably from Cook's voyage, and type of the Species' which if strictly interpreted should mean it was an *Endeavour* specimen. This specimen is 165 mm standard length (192 mm t.l.). Unfortunately, Solander gave no measurements for the specimens he examined and he apparently preserved seven specimens of the species. There is thus no way of telling whether this specimen is an *Endeavour* fish, or whether it was the one drawn – the drawing measures 152 mm S.L. (182 mm t.l.) and is thus close to the specimen in length. It could equally well be a *Resolution* specimen drawn by Forster and approaches that drawing closely in size; Wheeler (1981) considered it more likely to be the Forster specimen. It still possesses type status.

65.(**1**:61) *Balistoides viridescens* (Bloch & Schneider, 1801) Balistidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Oiree Nemoo/[ink] S. Parkinson'; *v.* [pencil] 'N° 57. Balistes Gigas/[ink] Otahite'. 266 × 371.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.65 (185) as Balistes gigas, Fig. Pict. Dryander – Catalogue probably f. 123 sketch with colours, Balistes —— Ot., S. Parkinson, one of two entries so labelled.

NOTES: Solander's manuscript name does not appear to have been used by subsequent authors.

66.(**1**:62) *Cantherhines dumerili* (Hollard, 1854) Balistidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Oilhe roweppa/[ink] S. Parkinson'; *v.* [pencil] 'The whole body of the fish fusca. the tail the same lighter at the tip the part/at the beginning of the tail dirty white the finns transparent the ribs/dirty yellow the Iris of the eye orange pupil black./72. Balistes chrysopterus/[ink] Otahite'. 267 × 370.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.129 (249) as Balistes chrysopterus. Dryander – Catalogue probably f. 123 sketch with colours, Balistes —— Ot., S. Parkinson, one of two entries so labelled.

NOTES: Schneider's (1801) use of the name *Balistes chrysopterus* appears to have been independent of Solander's manuscript.

67.(**1**:63) *Arothron meleagris* (Bloch & Schneider, 1801) Tetraodontidae

DRAWING: pencil with some colour; *r.* [pencil] 'Ehooi/[ink] S. Parkinson'; *v.* [pencil] 'the whole of this Fish fins & all is a purple black spotted with milk colour'd spots/the teeth dirty white/N°. 49 Tetraodon Meleagris/[ink] Otahite'. 270 × 371.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.78 (198) as Tetraodon meleagris; a note records that the specimen was skinned. Dryander – Catalogue f.125, one of two listed as sketch with colours, Tetrodon —— Ot., S. Parkinson.

NOTES: Schneider's (1801) name *Tetrodon meleagris* was derived from Lacepède's (1798) use of Le Tetrodon méléagris, the details of which in turn derived from a manuscript of Commerson. These names appear to be independent of Solander's name.

68.(**1**:64) *Aluterus scriptus* (Osbeck, 1765) Balistidae

DRAWING: finished water-colour; *r.* [ink] 'Balistes monoceros./Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Oct^{r}. 4 1768/Lat N.'. 234 × 292.

Fig. 6 *Aluterus scriptus* (Osbeck, 1765). A Parkinson drawing made in mid-Atlantic on 4 October 1768. (Catalogue number 68.)

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.191 (133) Oceano Atlantico inter tropicos Lat N. 11°, Oct. 4. 1768 captus as Balistes Monoceros; (D. & W. 45) S.C. Amphibia 1, f.238–239 – same data. Dryander – Catalogue f.123 as finished in colour Balistes Monoceros L. —— Oc., S. Parkinson.

NOTES: the name *Balistes monoceros* was taken from Linnaeus (1766), as the citation in the Solander Slip Catalogue makes clear (although the name dates from Linnaeus, 1758).

69.(**1**:65) *Lagocephalus spadiceus* (Richardson, 1845) Tetraodontidae

DRAWING: pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The black dark olive grey fading on the sides into brassy colour the belly white the P.D. &/upper part of the tail brassy olive the other fins white the iris yellow pupil black./Tetraodon assellinus/[ink] Endeavour's River'. 267 × 367.

MANUSCRIPT: Solander – (D. & W. 40) P.N.H. ff.12–15 (94) Habitat near Endeavour River careening place. Dryander – Catalogue f.125, probably the drawing entered as sketch without colours, Tetrodon —— N.C., S. Parkinson.

NOTES: the name Tetraodon assellinus, attributed to Solander MS *Pisces Novae Hollandiae*, was published by Richardson (1845) in the synonymy of his *T. spadiceus*. Richardson also referred to Parkinson's drawing (no.65) in the Banksian library.

70.(**1**:66) *Canthigaster solandri* (Richardson, 1845) Tetraodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Tāitāi/[ink] S. Parkinson'. *v.* [pencil] 'every spot is border'd w^{t} a dark line which turns paler as the/ground colour does./N^{o} 28 Tetraodon punctatus/[ink] Otahite'. 295 × 284.

MANUSCRIPT: Solander – (D. & W. 40) P.A.O.P. f.29 (147). Dryander – Catalogue f.125 as sketch with colours, Tetrodon —— Ot., S. Parkinson.

NOTES: Richardson (1845) cited this drawing in the Banksian library quoting both the folio number of the bound volume (66) and that of an earlier sequence 56, incorrectly for 57. He also incorrectly quoted the drawing as being labelled *Tetrodon cinctus* (although he did not attribute the name to Solander but suggested it was a later addition). In fact the name *T. cinctus* is written on the lower of the two drawings when they were mounted on a sheet for binding, and refers to no.71 of this catalogue. Richardson had a specimen from Belcher's voyage on the *Sulphur*, which he described and which is still extant. Later, Richardson (1848) corrected his attribution of the name *T. cinctus* to this drawing, correctly referred to it as *T. punctatus*, and quoted Solander's description of it in extenso. This followed re-examination of the Solander manuscripts and Parkinson drawings.

71.(**1**:66) *Arothron stellatus* (Bloch & Schneider, 1801) Tetraodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Hue Hue eti/Taitai/[ink] S. Parkinson/Tetraod. cinctus Specis'; *v.* [pencil] 'N^{o} 56/[ink] Otahite'. 236 × 284.

MANUSCRIPT: Solander – not identifiable in any mss. Dryander – Catalogue f. 125 as sketch with colours T. cinctus Brouss. —— Ot., S. Parkinson.

NOTES: the name Tetrodon cinctus was incorrectly attributed by Richardson (1845) – see discussion above – but was published with a description derived from the Parkinson drawing by Richardson (1848). He was clearly uncertain of its identity, and suggested that it closely resembled *T. lineatus* 'of the *Fauna Japonica*'. Richardson could not trace any description of this fish in the Solander manuscripts; if the Dryander Catalogue attribution of the name T. cinctus to P. M. A. Broussonet, is correct, then this would account for the name not appearing in Solander's manuscripts. Like other names, notably those in the genus *Chaetodon*, this was a Broussonet manuscript name.

72.(**1**:67) *Chilomycterus* cf. *antillarum* Jordan & Rutter, 1897 Diodontidae

DRAWING: partly coloured pencil sketch; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'the whole body & spines an olive colour the fins yellow – the spots mark'd & are black/ the pupil of the eye black the iris gold colour gradually fading into the olive &/very prominent/N°. 2 Diodon/[ink] Brasil'. 267 × 351.

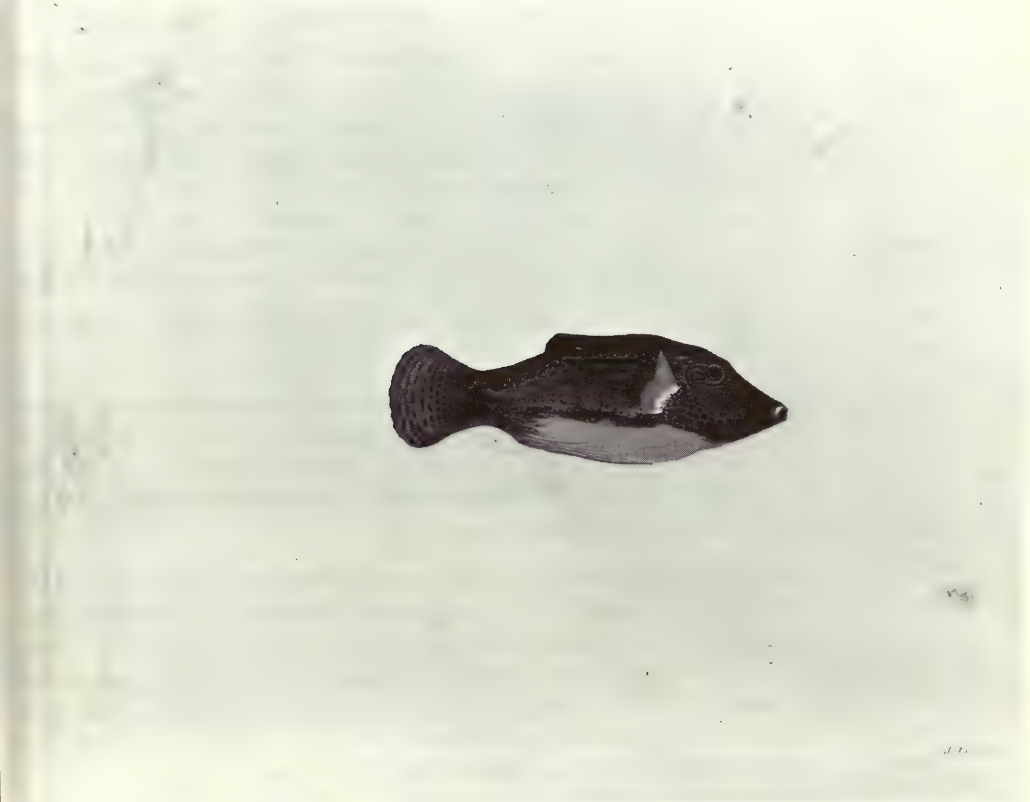

Fig. 7 *Canthigaster solandri* (Richardson, 1845). Parkinson's drawing made at Tahiti which was later used in part by Richardson (1845) to name this sharp-nosed puffer-fish in honour of Daniel Solander. (Catalogue number 70.)

MANUSCRIPT: Solander – not identifiable in any mss. Dryander – Catalogue f.127 as sketch with colours Diodon —— Bras., S. Parkinson.

NOTES: although there are three species of *Diodon* described in Solander's Slip Catalogue, Amphibia 1 (D. & W. 45) *viz.* D. erinaceus (f.261), D. aculeatus (f.262), and D. truncatus (f.263 – originally described as *Balistes*) none can be related to this Brazilian fish. The first relates to the next drawing (no.73, this catalogue), the other two were both from Jamaica and not *Endeavour* specimens. The identification of this drawing is tentative; too few features are clearly shown for certain identification.

73.(**1**:68) *Diodon hystrix* Linnaeus, 1758 Diodontidae

DRAWING: finished water-colour, two views the second of the fish inflated; *r.* [ink] 'Diodon Erinaceus/Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [ink] 'Oct^{r}. 7th. 1768/[ink] Lat. N.' 235 × 292.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Amphibia 1 f.261 as Diodon Erinaceus (this trivial name replaces Hystrix as originally written) 'Habitat in Oceano Atlantico. Lat. Sept IX.43. Oct. 7. 1768'. Dryander – Catalogue f.127 as finished in colours D. Erinaceus mss – Oc., S. Parkinson.

NOTES: Solander's name Diodon erinaceus seems not to have been published although Agassiz (1841) independently used this combination for a fossil fish.

This *Endeavour* specimen, captured in mid-Atlantic between the landfalls of Madeira and Rio de Janeiro, was one inch (26 mm) long, and exhibits the body form and colouring typical of the pelagic juvenile phase (Leis, 1977).

See also no.229 in this catalogue for a preliminary sketch.

74.(**2**:1) *Muraena helena* Linnaeus, 1758 Muraenidae

DRAWING: finished water-colour; *r.* [ink] 'Muraena guttata/Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Madeira/Rio Janeiro'. 299 × 480.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, ff.8–9 as Muraena guttata, 'Habitat ad Insulam Maderam Oceani Atlantici, etjam in Portu Fluvii St Januarii in Brasilia'; (D. & W. 42) C.S.D. f.201 (216) with same data, one of the two specimens was thirty inches long. Dryander – Catalogue f.131 as finished in colour M. guttata Mss —— Madeira, S. Parkinson.

NOTES: the Solander name *Muraena guttata* was published by Richardson (1848) who referred to both the Parkinson drawing and to a Banks–Solander manuscript. Unfortunately, Solander's name is not available for use as at the date of its publication by Richardson it was preoccupied nomenclaturally by *Muraena guttata* Risso, 1826. Kaup (1856) used the Solander name from Richardson as the type species of his genus *Limamuraena* but referred to Solander's manuscript again for details of the conformation of the nostrils; he specifically rejected Risso's name.

This drawing appears to have been made at Madeira as was Solander's manuscript description. It seems that another moray eel was obtained at Rio de Janeiro, which was thought to be the same species, and reference to this caused the confusion in locality ascriptions noted in Solander's notes.

75.(**2**:2) *Gymnothorax ocellatus* Agassiz, 1831 Muraenidae

DRAWING: finished water-colour; *r.* [pencil] 'muraena tricolor mss in mus. britt/ [ink] S. Parkinson'; *v.* [pencil] '15 Muraena/[ink] Brasil'. 273 × 356.

MANUSCRIPT: Solander – none (see under Notes). Dryander – Catalogue f. 131 as finished in colour M. tricolor Brouss. —— Brasil, S. Parkinson.

NOTES: the identification of this drawing is not certain and it may represent the species known as *G. nigromarginatus* Girard, 1858. No question of nomenclatural priority is involved, however, as Muraena tricolor is an unpublished name. Its attribution to Broussonet by Dryander is interesting and suggests that this may be the Brazilian fish which Solander considered to be identical with his Madeiran *Muraena guttata*; this would account for the absence of a separate entry in his manuscript notes. Despite Broussonet's annotation of 'in mus. britt.' no specimen which could be associated with this Brazilian fish is listed by Günther (1870) nor can be located now.

76.(**2**:3) *Echidna nebulosa* (Ahl, 1789) Muraenidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] pepedho'; *v.* [pencil] '69. Muraena geographica'. 298 × 470.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f. 132 (252) as Muraena geographica; vernacular names; Habitat Ulhaietea. Dryander – Catalogue f. 131 as sketch with colours Muraena —— Ulietea.

NOTES: this eel was collected at Uhlietea (= Raiatea) in the Society Islands between 20 and 24 July 1769; it was preserved in Cagg No 6, but no specimen in the Museum's collection was recognizable as the *Endeavour* specimen in Günther's *Catalogue of Fishes* (1870). The Solander manuscript description and Parkinson's figure were referred to and discussed by Richardson (1844–1848) and in almost identical phraseology by Kaup (1856). The name Muraena geographica was published in synonymy by Richardson.

77.(**2**:4) *Istiblennius lineatus* (Valenciennes in Cuvier & Valenciennes, 1836) Blenniidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Ohooa'; *v.* [pencil] 'N°. 46. Blennius lineatus/[ink] Otahite'. 269 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f. 79 (199) as Blennius lineatus; vernacular names. Dryander – Catalogue f. 137 as sketch with colours, Blennius —— Otahite, S. Parkinson.

NOTES: the use of the name *lineatus* by Valenciennes appears to have been independent from that of Solander. Although a specimen was preserved in Cagg No. 5 it could not be traced in the mid-1800s in the collection of the British Museum (Günther, 1861).

78.(**2**:5) *Pseudophycis bachus* (Forster in Bloch & Schneider, 1801) Moridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] '18. Blennius venustus/[ink] Totarranue'. 293 × 460.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. index (f.63) listed only. Dryander – Catalogue f.137 as sketch with colours, *Blennius* —— New Zealand, S. Parkinson.

NOTES: Solander's name venustus was published by Richardson (1843b) as *Brosmius venustus*. Richardson cited the Parkinson drawing but commented that he could not find the species described by Solander although he suggested that Solander's Blennius rubiginosus at f.14 (16) of *Pisces Australiae* (D. & W. 40a) might refer to it. This seems unlikely and although there is no description in the Solander manuscript, Blennius venustus is listed in the index to the fishes from New Zealand at folio 63. This index shows that one specimen only was obtained, gives no folio reference to its description and no serial number was allocated to it (this suggests that it was not preserved).

This drawing was reproduced by Whitehead (1968).

79.(**2**:6) *Echeneis neucrates* Linnaeus, 1758 Echeneidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Echeneis neucrates L.'; *v.* [pencil] 'N° 6/[ink] Otahite'. 298 × 472.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.113 (233) as Echeneis anguillaris from Tahiti, serial number A.176, Cagg No.6, one specimen; (D. & W. 40b) P.N.H. f.5 (87) as Echeneis neucrates Australian seas 24 May 1770. Dryander – Catalogue f.139 as sketch with colours, E. Neucrates L. Otahiti, S. Parkinson.

NOTES: the name *Echeneis neucrates* on the drawing appears to be an early identification which was later adopted by Dryander who also wrote the locality Otahite. If Dryander was correct in attributing the drawing to this locality then the specimen was the one which Solander described as Echeneis anguillaris; conversely, if the identification was correct, or written by Solander, then this specimen would have been the *E. neucrates* from Australia caught on 24 May 1770. At this date the *Endeavour* was at Bustard Bay, Queensland, 24°05′S., 151°48′E. (Groves, 1962)

The Solander name Echeneis anguillaris does not seem to have been published by later authors.

80.(**2**:7) *Coryphaena hippurus* Linnaeus, 1758 Corpyhaenidae

DRAWING: pencil sketch; *r.* [ink] 'S. Parkinson/[pencil] 15½'; *v.* [pencil] 'The predominent colours of this fish are blue, green & yellow the blue occupies/the back fin & parts of the back this gradually turns to Green on the sides & that/to a fine yellow which takes place on the belly & fins besides it is all over spotted w^{t} blue/the iris of the eye yellow green. – /N° 4. Coryphaena Hippuris/[ink] Rio de Janeiro'. 298 × 480.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.99, and (D. & W. 42)

C.S.D. f.209 (204), both giving two sets of meristic data and measurements of a specimen of 39 inches total length. Dryander – Catalogue f.139 as sketch without colours, *Coryphaena Hippuris* L. —— Brasil, S. Parkinson.

NOTES: the dolphin-fish was a well-known species which was presumably the reason Solander did not describe it fully. Neither of the two sets of meristic data are identical with those in Linnaeus (1766). Therefore it can be assumed that two specimens were examined. However, there is only the one set of measurements. As the specimens captured in the Atlantic Ocean were recorded in the Slip Catalogue only (and the foolscap manuscript Copies of Solander's descriptions was compiled from them) it seems very probable that the measurements of the 39-inch fish actually refer to the specimen drawn.

81.(**2**:8) *Xyrichthys novacula* (Linnaeus, 1758) Labridae

DRAWING: finished water-colour; *r.* [ink] 'Coryphaena Novacula./Sydney Parkinson pinx^{t} 1768/I.19. Madeira/[pencil] Coryphaena Novacula'; *v.* [pencil sketch of head of eel]/[pencil] 'Mem. the M.B. goes no further than opposite to the eye' [this probably refers to the branchiostegal membranes of the eel]. 238 × 295.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.107, and (D. & W. 42) C.S.D. f.211 (206); both with a full description of a fish six inches long from Madeira, vernacular name Papagaya. Dryander – Catalogue f.139 as finished in colours, *C. Novacula* L. —— Maderia, S. Parkinson.

NOTES: this is one of the finished drawings by Parkinson typical of his work at Madeira.

82.(**2**:9) *Xyrichthys pentadactylus* (Linnaeus, 1758) Labridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Paou'; *v.* [pencil] 'N^{o} 27. Coryphaena virens/[ink] Otahite'. 271 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.37 (155) as Coryphaena virens, vernacular name, one specimen serial number A71 in Cagg 3, and one, unmarked (= unnumbered) in Cagg 5; that there were two specimens is confirmed in the index to this manuscript (f.288). Dryander – Catalogue f.139 as sketch with colours Coryphaena —— Otahite, S. Parkinson.

NOTES: this drawing was copied for Cuvier and the name '*Coryphaena virens*' was attributed to Parkinson and published as *Xyrichthys virens* Valenciennes in Cuvier & Valenciennes, 1839. The drawing therefore has type status. The name *Coryphaena virens* Gmelin, 1789 appears to be a proposal of the name independent of Solander's usage but may have been another example of Broussonet communicating information from Banks's collections to Gmelin.

Although two specimens were preserved on the *Endeavour* neither seems to have been recognizable when Günther (1862) listed these wrasses in the British Museum.

83.(**2**:10) *Valenciennea strigatus* (Broussonet, 1782) Gobiidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Gobius strigatus Broussonet Ichth./Teipooa'; *v.* [pencil] 'N°. 60 Labrus delicatulus/[ink] Otahite'. 270 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.71 (191) as Labrus delicatulus, vernacular name, one specimen serial number A129 in Cagg number 1. Dryander – Catalogue f.139 as sketch with colours Gobius strigatus Brouss. —— Otaheite, S. Parkinson.

NOTES: Broussonet (1782) named this species *Gobius strigatus* in part on the Parkinson drawing and on Solander's manuscript description (the vernacular name Taiboa given in the Solander manuscript is identical in Broussonet, whereas the spelling on the drawing differs). Broussonet also cited the vernacular name Taipoa attributing it to J. R. Forster, and the locality he gave '*Oceanus* pacificus prope Insulam Otaheite, *J. R. Forster* (Mus. Britannic.)' implies that he employed a specimen from the *Resolution* voyage, collected by J. R. Forster, in the British Museum, for his description. There is a drawing (f.189) in the Forster drawings (Wheeler, 1981), but the species is not described in the published account of the zoology of the voyage (Forster, 1844). No specimens from either voyage exist in the British Museum (Natural History).

The Parkinson drawing appears to be the original for Nodder's illustration reproduced in Broussonet (1782).

84.(**2**:11) *Platycephalus fuscus* Cuvier & Valenciennes, 1829 Platycephalidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Earai eraere.'; *v.* [pencil] 'N° 63. Cottus Otahitensis./[ink] Otahite'. 272 × 374.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.114 (234) as Cottus otaheitensis, vernacular names, one specimen serial number A177 in Cagg number 6. Dryander – Catalogue f.141 as sketch with colour, Cottus —— Otahite, S. Parkinson.

NOTES: this drawing was mentioned by Cuvier (1829) in the description of *P. fuscus*, and the name *Cottus otaitensis* attributed to Parkinson; Cuvier also quoted from Solander's manuscript description in particular notes on the coloration and the vernacular names.

85.(**2**:12) *Scorpaena cardinalis* Richardson, 1842 Scorpaenidae

DRAWING: pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'the body the collour of minium spotted w^{t} dark red, mark'd on the belly w^{t} white the head scarlet spotted/ above with dark red & below w^{t} white the finns rather yellower than the body & mark'd with/dark red also the PA yellow spotted w^{t} red the end of the tail yellow/ 10. Scorpaena Cardinalis/[ink] aehie no Mauwe.' [pencil sketch of a crawfish.] 292 × 461.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.36 (38) as Scorpaena cardinalis,

habitat off Motuaro. Dryander – Catalogue f.141 as sketch without colours, Scorpaena —— New Zealand, S. Parkinson.

NOTES: this drawing and Solander's manuscript were cited by Richardson (1842*a*) as the sole source of information for his species. He quoted Solander's description almost verbatim. He also (Richardson, 1843*b*) referred to the differences between the locality given on the drawing, 'Eaheenomauwee' (= North Island of New Zealand) and in Solander's manuscript as 'Motuaro' (in the Bay of Islands). Richardson (1842*a*) also compared this drawing with Forster's drawing (vol. 2, f.190) of Scorpaena Cottoides (see Wheeler, 1981) of a specimen from Dusky Bay, but considered the latter to be a distinct species.

This drawing was reproduced by Whitehead (1968).

86.(**2**:13) *Scorpaenopsis gibbosa* Bloch & Schneider, 1801 Scorpaenidae

DRAWING: unfinished pencil sketch; *r.* [pencil] 'Scorpaena diabolus/Nohoo-/ Noohoo-noohoa teraou/[ink] S. Parkinson'; *v.* [pencil] 'N°. 52. Scorpaena marmorata/[ink] Otahite.' 271 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.75, (195) as Scorpaena marmorata. Dryander – Catalogue f.141 as Scorpaena —— sketch without colour Otaheite, S. Parkinson.

NOTES: Solander's notes in P.A.O.P. show that there were two specimens of Scorpaena marmorata, both were preserved: one numbered 122 in Cagg 5, the other numbered 187 in Cagg 6. The Parkinson drawing was referred to by Cuvier (in Cuvier & Valenciennes, 1829) under the name *Scorpaena diabolus*, but was not employed in Cuvier's diagnosis of the species. The figure was also cited by Richardson (1844–1845) but he apparently did not refer to the Solander description.

The drawing was reproduced by Whitehead (1968) as plate 32 with the caption to the drawing misplaced and labelled Plate 33; the annotations on the drawing were reproduced incorrectly.

The vernacular name given on the drawing is similar to the 'mohu tarao' given for *Scorpaenopsis* sp. by Randall (1973) and Bagnis *et al.* (1972).

No specimen which could have been *Endeavour* material was listed by Günther (1860).

87.(**2**:14) *Pterois radiata* Cuvier in Cuvier & Valenciennes, 1829 Scorpaenidae

DRAWING: unfinished water-colour; *r.* [ink] 'Pterois radiata/[pencil] gasterosteus volitans Linn. Scorpaena/[pencil] Tatary/Tataraìhíāu/[ink] S. Parkinson'; *v.* [pencil] 'N°. 41 Scorpaena radiata/[ink] Otaheite'. 272 × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.38 (156) as Scorpaena radiata – specimen A76 preserved in Cagg No.3. Dryander – Catalogue f.141 as Scorpaena —— sketch with colours, Otahite, S. Parkinson.

NOTES: Cuvier (1829) described *Pterois radiata* solely on the basis of the drawing

by Parkinson, but incorrectly alleged that Solander's notes contained nothing pertaining to the drawing. The Parkinson drawing is the sole source for the taxon and has type status. This drawing was reproduced by Whitehead (1968) as Plate 34.

88.(**2**:15) *Scorpaena porcus* Linnaeus, 1758 Scorpaenidae

DRAWING: finished water-colour; *r.* [ink] 'Scorpaena Patriarcha./Sydney Parkinson. pinx^{t} 1768'; *v.* [ink] 'Madera'. 293 × 462.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.217 (212) as Scorpaena patriarcha, habitat in Oceano Atlantico ad insulam Maderam, 14½ unc; (D. & W. 45) S.C. Pisces 1, ff.130–133v, same details. Dryander – Catalogue f.141 as Scorpaena Patriarcha, finished in colours —— Madeira, S. Parkinson.

NOTES: Solander's description in the Slip Catalogue are the original notes, the others are a later copy. The description is very detailed and Solander assumed he was dealing with a previously unknown species having failed to recognize his specimen as Linnaeus's *Scorpaena porcus*. Substantial parts of the description have been altered, as have those of his Scorpaena choirista (see number 91 of this catalogue); it is evident that the descriptions of both species became confused with one another.

This drawing was reproduced by Wheeler (1983) at plate 195.

89.(**2**:16) *Helicolenus papillosus* (Schneider in Bloch & Schneider, 1801) Scorpaenidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'the spots on the linea lateralis white/14. Scorpaena percoides/[ink] Motuaro'. 298 × 476.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.4 (6) as Scorpaena percoides, habitat Cape Kidnappers. Dryander – Catalogue as Scorpaena ——, sketch with colours, New Zealand, S. Parkinson.

NOTES: the *Endeavour* was at Motuaro in the Bay of Islands, North Island of New Zealand on 29 November and 2 December 1769. Richardson (1842*a*), who referred extensively to Solander's description and this drawing, alleged that this species was captured both off Cape Kidnappers and at Motuaro in Queen Charlotte's Sound, but it seems that only one specimen was captured on this voyage. *Sebastes percoides* was named by Richardson from the Solander manuscript and the drawing which therefore has type status. The drawing was reproduced by Whitehead (1968) as Plate 33, but the caption referring to this drawing is numbered 32.

Schneider's name *Synanceja papillosus* was based solely on Forster's manuscript description of a fish from Dusky Bay caught 30 March 1773 on the *Resolution* voyage and labelled *Scorpaena cottoides*. The drawing which was made from this specimen was briefly mentioned by Richardson (1842*a*) under *Scorpaena cardinalis*, which was based on a drawing by Parkinson and Solander's description (see number 85 of this catalogue). Cuvier (1829) refers to the Forster name under his account of *Scorpaena cirrhosa*.

90.(**2**:17) *Synanceja verrucosa* Bloch & Schneider, 1801 Scorpaenidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Ehoohoo pooa

pooa/D^r Vivian'; *v.* [pencil] 'N^o. 65 Scorpaena horrida/The ground of the fish is rather darker cover'd all over w^t a sort of shiny tubercles the tail & finns strip'd much in the manner of the other Scorpaena's the spots also darker/The eyes blueish grey./[ink] Otahite.' 298 × 417.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.115 (235) as Scorpaena horrida, one fish, vernacular names, specimen no A178 in Cagg number 6. Dryander – Catalogue f.141 as sketch with colours, Scorpaena —— Otahite, S. Parkinson.

NOTES: Solander identified this fish with Linnaeus's *Scorpaena horrida*; no later worker appears to have referred to the drawing. Although the specimen was preserved it does not appear in Günther's (1860) listing of the scorpaenid fishes in the British Museum.

91.(**2**:18*a*) *Pontinus kuhlii* (Bowdich, 1825) Scorpaenidae

DRAWING: finished water-colour; *r.* [ink] 'Scorpaena Choirista./Sydney Parkinson pinx^t 1768/T. 18. Madeira'; *v.* [pencil] 'Mem the Pinna dorsalis more diverging at front & center M.B. 7. the first spine of the/P.A. too long'. 234 × 292.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, ff.134–137*v* as Scorpaena chorista, Habitat in Oceano Maderam alluente, length of fish 8 inches; (D. & W. 42) C.S.D. f.213 (208) same data. Dryander – Catalogue f.141, as finished in colours, Scorpaena Choirista mss —— Madeira, S. Parkinson.

NOTES: this species was undescribed at the time of its capture and was not formally named for nearly 50 years. Unfortunately Solander's detailed description was not published and his name is unavailable. The name 'chorista' is explained by reference to the Solander manuscripts where the Madeiran name is recorded as 'Menino do Cor (Boy of the Choir)' (S.C. Pisces 1, f.134) and at f.137*v* by a note recording its colours as those of the vestments of a church choirboy. The rose colour of Parkinson's drawing suggests that choirboys wore some colour other than the present pale lilac in eighteenth-century Madeira.

A specimen, listed by Günther (1860) as 'e. Adult. Old Collection, as *Scorpaena chorista*', is undoubtedly the specimen from the *Endeavour* voyage and has recently been labelled as such in the collection of the British Museum (Natural History).

92.(**2**:18*b*) *Scorpaena isthmensis* Meek & Hildebrand, 1928 Scorpaenidae

DRAWING: finished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N^o. 15 Scorpaena/[ink] Brasil'. 232 × 289.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.141 as finished in colours, Scorpaena —— Brasil, S. Parkinson.

NOTES: no scorpaenid appears in Solander's manuscript notes (either S.C. or C.S.D. – D. & W. 45 and 42) on Brazilian fishes, and as the drawing bears no trivial name, it has to be assumed that this fish was not examined or described by Solander. The identification of this drawing is tentative bearing in mind the difficulty in identifying a scorpaenid fish from a drawing, but the presence of a

conspicuous dark blotch on the spiny dorsal fin, the dark colouring of the posterior end of the anal fin, and the dark posterior half of the pelvic fins all indicate that this fish was *S. isthmensis*, which is recorded from shallow water off Rio de Janeiro (Eschmeyer, 1965, 1969).

93.(**2**:19*a*) *Bothus podas maderensis* (Lowe, 1834) Bothidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N° 3. Pleuronectes Rhomboides/[ink] Madera'. 235 × 286.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, ff.156–157v as Pleuronectes Rhomboides, habitat in Mare Atlantico prope Insulam Maderam, total length 6½ inches; (D. & W. 42) C.S.D. f.219 (214) same data. Dryander – Catalogue as sketch with colours, Pleuronectes —— Brasil, S. Parkinson.

NOTES: Solander's trivial name Rhomboides was derived from the Rondelet (1554) classical name, which had been employed for the Mediterranean form of the species by many pre-Linnaean authors. There were no specimens in the British Museum which could have been the *Endeavour* material (Günther, 1862).

94.(**2**:19*b*) *Gymnachirus nudus* Kaup, 1858 Soleidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'all round the fins & the tail is a narrow border of white/the 3 last stripes but one are paler than the rest/the last of all at the end of the tail is almost black./N° Pleuronectes/[ink] Brasil'. 237 × 291.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.143 as sketch with colours, Pleuronectes —— Brasil, S. Parkinson.

NOTES: this seems to be yet another case of Solander failing to compile a description or propose a name for a specimen drawn by Parkinson at Brazil.

95.(**2**:20) *Bothus mancus* (Broussonet, 1782) Bothidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Patee maure/Pleuronectes pictus [deleted] mancus mss/[ink] S. Parkinson'; *v.* [pencil] '75 Pleuronectes maculata [ink] Ulhietea'. 272 × 372.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.132 (252) as Pleuronectes maculata, vernacular name, length 15 inches. Dryander – Catalogue f.143 as sketch with colours, P. Mancus Brouss. —— Society Islands, S. Parkinson.

NOTES: *Pleuronectes mancus* was described by Broussonet (1782) from a series of literary sources, most of which derived from Marcgrave (1658) and were thus from South American (Brazilian) waters, but also referring to both Solander's manuscript, and the manuscript and a specimen from J. R. Forster's voyage on the *Resolution*. Although Broussonet did not cite the Parkinson drawing (nor that of G. Forster – folio 192) he undoubtedly referred to them, and the annotation noted above in which 'Pleuronectes pictus' was changed to 'Pleuronectes mancus mss' is

probably Broussonet's. However, he certainly consulted the manuscript, and the *Endeavour* material has some claim to type status. His major source of information, however, appears to have been the Forster specimen preserved in the British Museum, collected at Anamoka (Namuka, Friendly Islands) on 28 June 1774, which was 114 lines (equals 11.4 inches) in standard length (see Wheeler, 1964). The Forster fish is no longer present in the collection of the British Museum (Natural History) (Wheeler, 1981).

The index of P.A.O.P. compiled by Solander (D. & W. 40c, folio 292) shows that the *Endeavour* specimen was not preserved.

96.(**2**:21) *Drepane punctata* (Linnaeus, 1758) Ephippidae

DRAWING: pencil sketch; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The whole fish silvery the spots fusca/Chaetodon punctatus L./[ink] Endeavours River'. 269 × 374.

MANUSCRIPT: Solander – (D. & W. 40b) P.N.H. f.9–21 (91) as Chaetodon punctatus, habitat near Endeavour River Careening Place. C. punctatus was also recorded at Tahiti see P.A.O.P. f.15* (132). Dryander – Catalogue f.147 as sketch without colours Chaetodon —— N.C. [Nova Cambria], S. Parkinson.

NOTES: Solander correctly identified the fish from the Endeavour River, caught between 17 June and 4 August 1770 with Linnaeus's species. His description was cited by Cuvier (1831).

It is not possible to relate any specimen in the British Museum (Natural History) to the Endeavour River fish.

97.(**2**:22*a*) *Zebrasoma scopas* (Valenciennes in Cuvier & Valenciennes, 1835) Acanthuridae

DRAWING: finished water-colour; *r.* [pencil] 'Chaetodon an militaris'; *v.* [pencil] 'N° 32 Zeus Elevatus/Erapepe/Taumata, the same name/with their [unreadable word]/[ink] Otahite'. 233 × 295.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.45, (163) as Zeus elevatus, vernacular names, specimen number A88 in Cagg No.3; Dryander – Catalogue f.141 as sketch with colours, Zeus ——. Otaheite, S. Parkinson.

NOTES: the fish depicted is a juvenile but the coloration is unusual as the species usually has vertical lines on the sides (Randall, 1955). Chaetodon militaris is probably a Broussonet annotation; this name is one of several in the genus *Chaetodon* which Broussonet communicated to Gmelin (1789). These names were published in a footnote (p.1269) but are not available in nomenclature.

98.(**2**:22*b*) *Chaetodon ulietensis* Cuvier in Cuvier & Valenciennes, 1831 Chaetodontidae

DRAWING: finished water-colour; *r.* [pencil] 'Ch. Falcula/(ulietensis, C.V.)/[ink] S. Parkinson/[pencil] Para harchah nouton [unreadable word]'; *v.* [pencil] 'N° 67 The fish lost/The snout a little reddish the stripes on the [? front] bright yellow or Orange [unreadable] the tops of the P.D. narrow edge of [unreadable] gray on the

P.A. the [unreadable] or rather grayish [unreadable] on the back [unreadable]/ [ink] Ulhietea'. 233 × 295.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. not traceable due to absence of a Solander name on the drawing, possibly referred to at f.41 (159) as 'N.B. in Cagg N^{o} 3 two Chaetodon's figured by M^{r} Parkinson, not described'. Dryander – Catalogue due to the absence of a trivial name on this drawing it is not identifiable.

NOTES: this drawing (or rather a copy of it) was used as the sole source of Cuvier's (1831) name *Chaetodon ulietensis*; it therefore has type status. The drawing was reproduced by Whitehead (1968) as Plate 16, labelled *Chaetodon falcula*. The annotation 'Ch. falcula (ulietensis, C.V.)' is in the hand of Albert Günther; the two names were long treated as synonyms, but Burgess (1978) regards them as distinct. There are no specimens in the British Museum (Natural History) which could be regarded as *Endeavour* material.

99.(**2**:23*a*) *Cheilodactylus* (*Goniistius*) *vestitus* (Castelnau, 1878) Cheilodactylidae

DRAWING: finished pencil, lateral view by H. D. Spöring; *r.* [pencil] 'CHAETODON/gibbosus/Long. natur./[ink] Spöring'; *v.* [ink] 'Endeavours river'. 238 × 328.

MANUSCRIPT: Manuscript: Solander – not traceable in the manuscript P.N.H. (D. & W. 40b). Dryander – Catalogue f.147 as finished without colour, Chaetodon — – N.C. (Nova Cambria), Spöring.

Fig. 8 *Cheilodactylus* (*Goniistius*) *vestitus* (Castelnau, 1878). Drawing by Spöring of a fish from Endeavour River. (Catalogue number 99.)

NOTES: this fish was not described by Solander. Only 15 species of fish were described from New Holland; several of these were drawn by Spöring, a much higher proportion than his zoological drawings elsewhere.

Richardson (1841) described *Cheilodactylus gibbosus* from two specimens collected by John Gould in Western Australia but added '. . . the fish also inhabits the seas of New Zealand, Mr. Gray having recognised a drawing by Parkinson of a specimen which was caught in Endeavour River, on Cook's second voyage as being a correct representation of this fish. (Vide Banks, Icon. ined. t. 23)'. This suggests that at the date of reading the paper (9 March 1841) Richardson had not himself examined the Parkinson drawings. It also suggests that both Gray and Richardson had confused the first and second Cook voyages, and moreover had misplaced the Endeavour River to New Zealand (rather than present-day Queensland); possibly it was this that caused Richardson to attribute other Australian (New Holland) fishes to the New Zealand fauna (see numbers 49, 50 and 51 in this catalogue). Despite all this confusion it was the apparent identity of the *Endeavour* drawing with Gould's fishes which led Richardson to adopt Solander's manuscript name *Chaetodon gibbosus*, inappropriately as it has recently transpired. Randall (1983) has recently confirmed that *Cheilodactylus gibbosus* Richardson, 1841 is confined to the coast of Western Australia. The morwong which occurs at Endeavour River (and off eastern Australia and in the adjacent Pacific Ocean) is *Cheilodactylus* (*Goniistius*) *vestitus* (Castelnau, 1878).

There are no specimens in the British Museum (Natural History) which can be associated with the *Endeavour* collection.

100.(**2**:23*b*) *Chaetodon trifascialis* Quoy & Gaimard, 1825 Chaetodontidae

DRAWING: finished water-colour; *r.* [pencil] 'Ch. strigangulus/[ink] S. Parkinson'; *v.* [pencil] 'N°. 6 Chaetodon strigangulus/[ink] Otahite'. 263 × 326.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.70 (190) as Chaetodon strigangulatus, vernacular names, three specimens preserved, number A128 in Cagg 5, and two specimens A144 in Cagg 6. Dryander – Catalogue f.147, five Parkinson drawings from the Society Islands are listed as sketch with colours Chaetodon; this may be one of the five.

NOTES: the name *Chaetodon striganguli* was published by Gmelin (1789) in a list of species of *Chaetodon* supplied by Broussonet. No doubt Broussonet derived the name from this drawing if not from Solander's manuscript. The name is not available from this date. However, Cuvier (1831) formally published Solander's name, referring to this drawing, and pointing out that the specimen was then in Broussonet's collection. He also referred to Broussonet's communication to Gmelin. Following Cuvier the name *Chaetodon strigangulus* was used by numerous authors (for synonymy see Burgess, 1978).

The Broussonet specimen is still preserved in the Muséum National d'Histoire Naturelle, Paris (MNHN-9680); Bauchot (1969) listed it as *C. trifascialis*. The other specimens from the voyage appear not to have survived; they are not in the British Museum (Natural History).

The drawing was also cited by Lay & Bennett (1839) in an independent proposal

of the name *Chaetodon strigangulus*. They also quoted extensively from the Solander manuscript.

This drawing was reproduced in Whitehead (1968) at Plate 18 as *Megaprotodon strigangulus* (Cuvier, 1831).

101.(**2**:24*a*) *Chaetodon citrinellus* Cuvier, in Cuvier & Valenciennes, 1831
Chaetodontidae

DRAWING: finished water-colour; *r.* [pencil] 'Ch. citrinellus mss/Paraharaka eroutoi/[ink] S. Parkinson'; *v.* [pencil] 'to be spotted/where the dotts is, colours sweeten'd in the scales very faint & those on the fins very small – /N° 13. Chaetodon punctatus./[ink] Otahite'. 255 × 326.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.15* (132) as Chaetodon punctatus. Dryander – Catalogue f.147 as sketch with colours, Chaetodon citrinellus Brouss —— Soc. Isl., S. Parkinson.

NOTES: the name *citrinellus* was coined by Broussonet for this specimen and it was one of several names in *Chaetodon* which he communicated to Gmelin (1789), although it it not available nomenclaturally from that date. However, Cuvier (1831) validated it citing the Parkinson drawing in Banks's library and Solander's manuscript in addition to other material. He had a specimen from Broussonet, believed to have come from the *Endeavour* collection, which is still preserved in the Muséum National d'Histoire Naturelle, Paris (MNHN-9905) (Bauchot, 1969).

102.(**2**:24*b*) *Chaetodon trifasciatus lunulatus* Quoy & Gaimard, 1824
Chaetodontidae

DRAWING: finished water-colour; *r.* [pencil] 'Ch. vittatus/Seb. th.3 tab.29. f.18. Ch. bellissimus Paraharaka ututhi/[ink] S. Parkinson'; *v.* [pencil] 'N° 35[ink] Otahite'. 236 × 296.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.147, possibly the drawing labelled Chaetodon bellus Brouss. —— Society Islands, S. Parkinson.

NOTES: none of the names given in the annotations to the drawing can be identified with entries in Solander's manuscript. The drawing may be the one Dryander listed as *C. bellus* in his *Catalogue*, and this name was one of the several communicated by Broussonet to Gmelin (1789) as *belli*. This drawing was referred to by Cuvier (1831) under his account of *Chaetodon trifasciatus* Park, 1797 as a good illustration by Parkinson. For many years this species has been referred to by Park's name but Burgess (1978) divided the species into two subspecies of which the Pacific form is *C. trifasciatus lunulatus*.

The name *Chaetodon vittatus* published by Bloch & Schneider, 1801, was based solely on Park's description and is thus a junior objective synonym of *C. trifasciatus*.

Lay & Bennett (1839) cited this drawing as *Chaetodon bellus* under their description of *Chaetodon vittatus*, and also drew attention to their inability to find a description in the Solander manuscript.

A specimen in the British Museum (Natural History) (Günther, 1860:24,

specimen g) from the Old Collection may be the *Endeavour* specimen. It is 108 mm T.L. (92 mm S.L.).

103.(**2**:25) *Naso unicornis* (Forsskål, 1775) Acanthuridae

DRAWING: finished water-colour; *r.* [pencil] 'Lat- Aumàumā/Eumae/variet Chaet. unicornis ?/[ink] S. Parkinson'; *v.* [pencil] 'the spots on the P.D. & lines on the P.A. are pale grey – about the middle of the back is a ridge/2 spots of dark blue near the tail. the green brighter on the sides – /N° 5 Chaetodon olivaceous/[ink] Otahite'. 270 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.7 (194) as Chaetodon olivaceus, one specimen number A.124, in Cagg 5 (also f.10* (125) another specimen 'unmark'd in y^e^ old Cagg'; the first specimen was the figured one). Dryander – Catalogue f.145, as sketch with colours, C. unicornis var. Brouss. —— Soc. Isl., S. Parkinson.

NOTES: this drawing and Solander's description together served as the sole source of Valenciennes's (1835) name *Naseus olivaceus*. Günther (1861) recognized this species and listed a specimen as 'a. Four inches long. Otaheiti. Type of the species . . .'; this specimen is still preserved in the British Museum (Natural History) at 1962.12.14.3., it is 109 mm T.L. (90 mm S.L.). This illustration was reproduced by Whitehead (1968) as Plate 22; he gives the length of the drawing as 120 mm T.L. Recently remeasured it is 118 mm, which is near enough to the length of the surviving specimen allowing for shrinkage over two hundred years in alcohol, to permit recognition of it as the type specimen.

104.(**2**:26) *Chaetodon* (*Lepidochaetodon*) *unimaculatus unimaculatus* Bloch, 1787 Chaetodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Ch. unimaculatus/chaet. fugitivus mss/Paraharahe teare/[ink] S. Parkinson'; *v.* [pencil] 'N° 18 Chaetodon ocellatus/[ink] Otahite'. 270 × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.69 (189) as Chaetodon ocellatus, vernacular names, three specimens marked A.126 in Cagg 5, one unmarked (the list of specimens preserved at f.290 gives two specimens marked A.126). Dryander – Catalogue f.147 as sketch with colours, C. fugitivus Brouss. —— Society Islands, S. Parkinson.

NOTES: this drawing and the Solander description were cited by Cuvier (1831) under the description of *Chaetodon unimaculatus* Bloch. Solander's name Chaetodon ocellatus was used independently by Bloch (1781) for a different taxon. The third name in the annotations, Chaetodon fugitivus, was Broussonet's and was published by Gmelin (1789) as *C. fugitivi* although it is not a name available in zoological nomenclature from this date.

Günther (1860) lists a specimen of *Chaetodon unimaculatus* as 'c. Adult: bleached. Old Collection' which may be one of the *Endeavour* specimens, although at 90 mm T.L. (75 mm S.L.) it is too small to be the figured specimen if that was drawn life size. Whitehead (1968) gives the drawing as 116 mm T.L.

105.(**2**:27*a*) *Chaetodon lunula* (Lacepède, 1803) Chaetodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Ch. lunula/[ink] S. Parkinson'; *v.* [pencil] 'Čhaetodon corruscus/[ink] Princess Island'. 256 × 323.

MANUSCRIPT: Solander – none. Dryander – Catalogue – no drawing listed from Princes Island.

NOTES: a specimen from the Old Collection still exists in the British Museum (Natural History) with the locality Princes Island on its label; it is specimen 'a' of Günther (1860:25). The specimen is in poor condition, is 135 mm S.L., 153 T.L. Adhering under the bottom of the bottle is a label 'Chaetodon corruscus Princes Island'. This seems sufficient evidence to consider it to be an *Endeavour* specimen.

106.(**2**:27*b*) *Centropyge flavisimus* Cuvier in Cuvier & Valenciennes, 1831 Pomacanthidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N° 32/ The whole fish is a fine bright orange like the rupicola having a narrow black [border – deleted] at the edge of the/soft part of the P.D. & Pect. & tail. the circle round the eye & the marks by the gills ultramarine./the Iris of the eye brownish gold colour pupil black./Chaetodon luteolus [ink] Otahite'. 235 × 290.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.15* (132) as Chaetodon luteolus. Dryander – Catalogue f.147, presumed to be one of several unspecified drawings of *Chaetodon* by Parkinson from the Society Islands.

NOTES: this drawing was cited by Cuvier (1831) as the sole source of his *Holacanthus luteolus* Cuvier, in Cuvier & Valenciennes, 1831; he appears to have known only the drawing not Solander's manuscript.

107.(**2**:28) *Acanthurus lineatus* (Linnaeus, 1758) Acanthuridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Chaetodon lineatus L./[ink] S. Parkinson'; *v.* [pencil] 'Amàroa/The edging round the P.D. & Pect. is pale sky blue./N° 16 Labrus elegantissimus/[ink] Otahite'. 269 × 378.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.21 (139) as Labrus elegantissimus, specimen A51 (apparently not preserved see f.(287)). Dryander – Catalogue not entered as Labrus elegantissimus, the drawing may have been one of several listed as *Labrus* from the Society Islands, ff.151–153.

NOTES: Solander's manuscript name Labrus elegantissimus seems not to have been used by later workers.

108.(**2**:29*a*) *Zanclus cornutus* (Linnaeus, 1758) Acanthuridae

DRAWING: finished water-colour; *r.* [pencil] 'pale blue [note referring to dorsal fin]/Ch. Cornutus L/Tatàhee/[ink] S. Parkinson'; *v.* [pencil] 'there is of this fish as large again/N° 21 Chaetodon rostratus/[ink] Otahite'. 237 × 294.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.1 (113) as Chaetodon

rostratus, several specimens listed at numbers A1, A77 and A162; specimen A77 is noted as 'larger and better'. Dryander – Catalogue f.145 as sketch with colours Chaetodon cornutus L. —— Society Islands, S. Parkinson.

NOTES: the note on the drawing 'there is of this fish as large again' was presumably made with reference to the note in Solander's manuscript that specimen A77 was 'larger and better' than the drawn specimen. A total of four specimens were preserved (Solander, P.A.O.P. f.(285)) on the voyage. Günther (1860:493) listed two specimens of *Z. cornutus* as from the Old Collection (specimens m and n); possibly both were from the *Endeavour* voyage but both have subsequently been deleted from the annotated catalogue and presumably destroyed.

109.(**2**:29*b*) *Chromis chromis* (Linnaeus, 1758) Pomacentridae

DRAWING: finished water-colour; *r.* [ink] 'Chaetodon luridus/[pencil] castaneus mss/[ink] S. Parkinson/T.20. Madeira'; *v.* [none]. 145 × 236.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.176–177*v.* as Chaetodon luridus, habitat in Oceano Atlantico ad Maderam, vernacular name Castanhete; (D. & W. 42) C.S.D. f.227 (254), same data. Dryander – Catalogue f.147 as finished in colours, Chaetodon luridus Broussonet —— Madeira, S. Parkinson.

NOTES: the name *Chaetodon luridus* was published by Cuvier (1830) and derived from a specimen in Broussonet's collection. This specimen is still preserved in the Muséum National d'Histoire Naturelle (MNHN 5286) S.L. 82 mm (T.L. 110). It is the holotype of *Glyphisodon luridus* Cuvier in Cuvier & Valenciennes, 1830 and is undoubtedly the *Endeavour* specimen from Madeira. The name, as *C. luridi*, was communicated by Broussonet to Gmelin (1789) but is not available for zoological nomenclature as of this date. As Cuvier pointed out, Solander also used the name *Chaetodon luridus* for an acanthurid from Tahiti (see P.A.O.P. f.47 (165), three specimens preserved, A91, A99, and A174), but Cuvier was apparently unaware that the Madeiran fishes were described and listed in the Solander *Slip Catalogue* (D. & W. 45) not in the formal manuscript from the voyage which, it is believed, Cuvier had had copied (see earlier p.23, and Diment & Wheeler (1984)).

110.(**2**:30*a*) *Acanthurus glaucopareius* Cuvier, 1829 Acanthuridae

DRAWING: unfinished water-colour; *r.* [pencil] 'ch. glaucopareius mss./id Seba Thes.3. t25. n.3/Maito/[ink] S. Parkinson'; *v.* [pencil] 'N° 62 Chaetodon umbra/[ink] Otahite'. 258 × 329.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.116, (236) as Chaetodon umbra, one specimen preserved, numbered A179, in Cagg 6. Dryander – Catalogue f.145 as Chaetodon glaucopareius Broussonet, sketch with colours —— Society Islands, S. Parkinson.

NOTES: *Acanthurus glaucopareius* was a name communicated to Cuvier by J. R. Forster, on the basis of a specimen from Cook's *Resolution* voyage which was later named *A. nigricans* Bloch & Schneider, 1801. The *Endeavour* specimen was not referred to in either account.

111.(**2**:30*b*) *Chaetodon vagabundus* Linnaeus, 1758 Chaetodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'dark chestnut [refers to colouring of caudal fin edge]/Ch. vagabundus/chaet. speciosus mss./Dors. 12 totium/ Parahã/Paraharaha outou rore [indecipherable]/[ink] S. Parkinson'; *v.* [pencil] 'N°. 48 Chaetodon aulicus/[ink] Otahite'. 246 × 341.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.81 (201), vernacular names, one specimen, numbered A136, in Cagg 5. Dryander – Catalogue f.147 as Chaetodon speciosus Broussonet, sketch with colours —— Society Islands, S. Parkinson.

NOTES: both the names C. speciosi and C. aulici were published by Gmelin (1789) in a note communicated by Broussonet, but neither name is available for zoological nomenclature. Cuvier (1831) refers to this drawing, using the name *Chaetodon speciosus*, within the synonymy of *C. vagabundus*, and referring to the citation in Gmelin. The specimen from Broussonet's collection was examined by Cuvier; it is still preserved in the Muséum National d'Histoire Naturelle, Paris (MNHN A 10067) S.L. 89 mm (T.L. 108) (Bauchot, 1969). This is presumed to be the *Endeavour* specimen.

112.(**2**:31*a*) *Heniochus chrysostomus* Cuvier in Cuvier & Valenciennes, 1831 Chaetodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'chaetodon macrolepidotus L./ Tatoha/Peooè/[ink] S. Parkinson'; *v.* [pencil] 'N°. 54 Chaetodon Chrysostomus/ [ink] Otahite'. 247 × 330.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.64 (184), as Chaetodon chrysostomus, vernacular names, one specimen, numbered A117 in Cagg 5. Dryander – Catalogue f.145, as sketch with colours, Chaetodon macrolepidotus L. —— Society Islands, S. Parkinson.

NOTES: *Heniochus chrysostomus* was described by Cuvier (1831) solely from this drawing by Parkinson and the name was derived from the annotation on it; he made no reference to the Solander manuscript description. This drawing therefore has some type status. Both the drawing and the Solander manuscript were cited by Lay & Bennett (1839) and they quoted extensively from the latter under the name *Heniochus chrysostomus*.

This drawing was reproduced by Whitehead (1968) as plate 17, identified as *Heniochus acuminatus* (Linnaeus, 1758).

113.(**2**:31*b*) *Abudefduf sexfasciatus* (Lacepède, 1801) Pomacentridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Chaet. saxatilis L./Emanmoa'; *v.* [pencil] '73 Chaetodon coelestinus/[ink] Ulhietea'. 249 × 328.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.129, (249) as Chaetodon coelestinus, total of four specimens, one reference number A200 in Cagg 6 (but not marked with the number) and three unnumbered, 'Hab. in Oceano Pacifico prope

Fig. 9 *Kyphosus sectatrix* (Linnaeus, 1766). A Parkinson drawing of a rudder-fish made in the tropical Atlantic in 1768. (Catalogue number 114.)

Insulam Ulhaietea'. Dryander – Catalogue f. 145 as sketch with colours C. saxatilis L. —— Society Islands, S. Parkinson.

NOTES: this drawing and Solander's description together were used by Cuvier (1830) for the name *Glyphisodon coelestinus* Solander, although Cuvier also had other material and discussed other literary references. Cuvier's figure (Plate 135) is reversed from the Parkinson drawing and is slightly smaller but the two are very similar and the plate may have been engraved from a copy of the drawing.

This drawing was reproduced by Whitehead (1968) as Plate 23 *Glyphisodon coelestinus* Cuvier, 1830; as he pointed out in the notes to this plate a specimen listed by Günther (1862) as from the Old Collection, but subsequently destroyed, may have been the *Endeavour* specimen.

114.(**2**:32) *Kyphosus sectatrix* (Linnaeus, 1766) Kyphosidae

DRAWING: finished water-colour; *r.* [ink] 'Chaetodon cyprinaceus/Sydney Parkinson pinx[t] ad vivum 1768'; *v.* [ink] 'Nov[r]. 15. 1768 Lat. N.'. 273 × 366.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f. 166–167v. as Chaetodon cyprinaceus, 'Habitat in Pelago intra Tropicas, ubi Latid. Sept. VI. 50 [i.e. 6° 50′ N.]. Longit. occid. a Londini xxi.7. [i.e. 21° 7′ W of Greenwich] captus Oct[r]. 15. 1768'. (D. & W. 42) C.S.D. f.223 (250) as above. Dryander – Catalogue as Chaetodon cyprinaceous MSS, finished in colours —— Ocean, S. Parkinson.

NOTES: Solander's name *Chaetodon cyprinaceus* was published by Cuvier (1831) in the discussion of the species he called *Pimelepterus boscii* Lacepède. Cuvier cited both the Parkinson drawing and Solander's manuscript description, correctly giving the date as 15 October 1768 (not November as is written on the drawing). The name was one of the several species referred to the genus *Chaetodon* and communicated by Broussonet to Gmelin (1789) who published it as *C. cyprinacei*.

A specimen from Broussonet's collection is still preserved in the Muséum National d'Histoire Naturelle (MNHN-2977), S.L. 121 mm (T.L. 160) originally registered as *Chaetodon cyprinaceus* Broussonet (Bauchot, 1969). Specimens with a similar name were recorded by Günther (1859) under the taxa *Pimelepterus fuscus* ('d. Young. Old Collection, as *Chaetodon cyprinoides*') and *Pimelepterus waigiensis* ('a. Adult. Old Collection, as *Chaetodon cyprinoides*') Although there is no record of more than one specimen being caught on the *Endeavour* voyage the similarity of names suggests they might date from this period.

115.(**2**:33) *Kyphosus incisor* (Cuvier in Cuvier & Valenciennes, 1831) Kyphosidae

DRAWING: finished water-colour; *r.* [ink] 'Chaetodon incisor./Sydney Parkinson pinxt 1769'; *v.* [ink] 'Brasil'. 294 × 467.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.168–171 as Chaetodon incisor, 'Habitat in Brasilia', length 535 mm ('Diameter longitudinalis 21 unc'). (D. & W. 42) C.S.D. f.225 (252) same data. Dryander – Catalogue f.145 as Chaetodon incisor Mss, finished in colours —— Brasil, S. Parkinson.

NOTES: Cuvier (1831) adopted the Solander name *Chaetodon incisor*, although he attributed it to Parkinson, in his description of *Pimelepterus incisor*, although he had other material in addition. He also cited Solander's manuscript, so this drawing and the associated description have some standing as type material.

This drawing was reproduced by Whitehead (1968) at Plate 14.

116.(**2**:34) *Chaetodipterus faber* (Broussonet, 1782) Ephippidae

DRAWING: finished water-colour; *r.* [ink] 'Chaetodon Gigas./Sydney Parkinson pinxt 1769'; *v.* [pencil – partly indecipherable notes on coloration in four lines] [ink] 'Brasil'. 288 × 455.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.161–163*v* as Chaetodon gigas, 'Habitat in Brasilia at Rio Janeiro', length 20 inches. (D. & W. 42) C.S.D. f.221 (245), same data. Dryander – Catalogue, f.145 as Chaetodon gigas Mss, finished in colours — Brasil, S. Parkinson.

NOTES: although the name *Chaetodon faber* was proposed by Broussonet (1782) he did not associate this drawing or the description with it. His name was based on several earlier literary sources, and specimens (or records of occurrence) from Jamaica and Carolina. He also cited a specimen in 'Mus. Banks' collected in the Society Islands by Banks and Solander; this could not have been the specimen from which the drawing was made which came from Brazil. Broussonet's species is clearly composite as *C. faber* is not found in the Indo-Pacific.

117.(**2**:35) *Abudefduf saxatilis* (Linnaeus, 1758) Pomacentridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Chaetodon/[ink] S. Parkinson'; *v.* [pencil] 'N° 16 Sparus/[ink] Brasil'. 271 × 368.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.211 as Sparus latus; it is not certain that this entry refers to this drawing, but the note 'Fig. Pict' shows that there was a drawing made of this Brazilian specimen. Dryander – Catalogue f.149 probably the second entry under *Sparus*, sketch with colours, Sparus —— Brasil, S. Parkinson.

NOTES: as there is no trivial name associated with this annotation of *Sparus* it is difficult to relate it to the manuscript. However, for the reasons given above this fish may have been the species Solander named Sparus latus.

118.(**2**:36) *Pseudolabrus miles* (Bloch & Schneider, 1801) Labridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] '20 Sparus rubecula α/[ink] Totarranue'. 267 × 371.

MANUSCRIPT: Solander – (D. & W. 40a) P.A., f.6 (8) as Sparus rubecula α, habitat off Cape Kidnappers, one specimen, numbered B9. Dryander – Catalogue f.149 as sketch with colours Sparus —— New Zealand, S. Parkinson.

NOTES: Solander's name was published by Richardson (1843*c*) as *Julis? rubecula*, and he cited Parkinson's drawing deriving the coloration from it and extensively quoted Solander's manuscript description. The drawing therefore has some type standing. Totara nui or Queen Charlotte Sound, South Island, was visited between 15 January and 6 February 1770.

119.(**2**:37*a*) *Pseudolabrus celidotus* (Bloch & Schneider, 1801) Labridae

DRAWING: unfinished pencil sketch; *r.* [ink] 'S. Parkinson'; *v.* [pencil] '16 Sparus notatus/[ink] Totarra nue'. 257 × 329.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.12 (14), as Sparus notatus habitat Tolaga, five specimens preserved with the serial number B.17. Dryander – Catalogue f.149 as sketch without colours Sparus —— New Zealand, S. Parkinson.

NOTES: Richardson (1843*c*) adopted Solander's name for his *Julis? notatus* and extensively quoted his description, as well as referring to this drawing. As he pointed out Parkinson's drawing is labelled Totarra nue (in Queen Charlotte's Sound) while Solander's description is of a fish from Tolaga (38°20′S, 178°21′E) on North Island, where the *Endeavour* was between 23 and 29 October 1769. This drawing therefore has some type status.

It was reproduced by Whitehead (1968) as Plate 25A.

120.(**2**:37*b*) *Diplodus sargus* (Linnaeus, 1758) Sparidae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Sparus Sargus/Buchan'; *v.* [ink] 'Madera'. 185 × 271.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.193–194v as Sparus sargus, habitat in Mari Atlantico Madera, length 4 inches. (D. & W. 41) F.C. f.229 (256), same data. Dryander – Catalogue f.149 as Sparus sargus, finished in colours —— Madeira, Buchan.

NOTES: this well-known European sea bream was briefly described by Solander; he included the Madeiran vernacular name 'Sargo' interpreting it parenthetically as 'accute or cunning fellow'.

121.(**2**:38) *Pseudolabrus miles* (Bloch & Schneider, 1801) Labridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] '4 Sparus rubiginosus β/[ink] Mattaruwhow'. 272 × 331.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.7 (9) as Sparus rubiginosus var β, habitat off Cape Kidnappers, one specimen labelled B.8. (Also references to S. rubiginosus var α at P.A., f.7 (9) and P.A.O.P. f.47 (123) (D. & W. 40c).) Dryander – Catalogue f.149, probably one of the sketches without colour (erroneously) Sparus —— New Zealand, S. Parkinson.

NOTES: Richardson (1843*c*) published Solander's name as *Julis? rubiginosus*, quoting his description extensively and referring to Parkinson's drawing. The drawing therefore has some type status. As Richardson pointed out Parkinson's figure was drawn from a specimen taken at Mattaruhow and Solander's description from a specimen off Cape Kidnappers.

This drawing was reproduced by Whitehead (1968) as Plate 25B.

122.(**2**:39) *Archosargus rhomboidalis* (Linnaeus, 1758) Sparidae

DRAWING: unfinished water-colour by A. Buchan; *r.* [pencil] 'the orange more of a Golden Colour/the white Like silver mixt with purple/[ink] Buchan'; *v.* [pencil] 'N°. 7. Sparus rhomboides/[ink] Brasil'. 268 × 363.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.149 as sketch with colours Sparus —— Brasil, Buchan.

NOTES: the annotations correcting the colouring on the drawing help confirm the identification of this fish.

123.(**2**:40) *Nemadactylus macropterus* (Bloch & Schneider, 1801) Cheilodactylidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sparus carponemus mss/[ink] S. Parkinson'; *v.* [pencil] '3. Sciaenoides abdominalis [ink] Queen Charlottes Sound'. 293 × 477.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.29 (31) and f.9 (11), as Sciaena abdominalis, both with 'Fig. Pict.' hence suggesting there were two illustrations (see no. 138). Dryander – Catalogue f.155 as sketch with colours, Sciaena [in pencil Sparus carponemus Brouss.] —— New Zealand, S. Parkinson.

NOTES: this species was drawn and described twice. Firstly, off 'Cape Kidnappers'

(f.9 (11)) where two specimens were preserved numbered B.5. Secondly, in Motuaro Bay on 24 November 1769, stated Longitude LXXX W. (f.29 (31)). The second drawing is no. 138 of this catalogue.

This drawing was referred to by Cuvier (1830) under his account of *Cheilodactylus carponemus* as his reference to Queen Charlotte Sound proves. However, this locality is spurious, as discussed under number 138 of this catalogue.

124.(**2**:41) *Anamses coeruleopunctatus* Rüppell, 1829 Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Padee/[ink] S. Parkinson'; *v.* [pencil] 'The whole colour of the fish is darker blue done w^t^ Ultramarine/the red there a cast of Green especialy on the back towards the tail./N^o^ 24 Sparoides azureus/[ink] Otahite'. 269 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.50 (170) as Sparoides azureus, one specimen numbered A.98 in Cagg 4. Dryander – Catalogue f.149 [pencil entry], sketch with colours, Sparoides —— Society Island, S. Parkinson.

NOTES: Solander's name *Sparoides azureus* does not seem to have been taken up by any later author. Two specimens in the British Museum collection listed by Günther (1862) as 'c, d. Adult: not good state.' might possibly have been *Endeavour* material but have been destroyed since Günther wrote.

125.(**2**:42) *Calotomus carolinus* (Valenciennes in Cuvier & Valenciennes, 1840) Scaridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Êuhoo uelha/[ink] S. Parkinson'; *v.* [pencil] 'the head blue green streaked w^t^ red the body redish brown inclining to purple towards/the base of each scale red darker on the back & lighter on the belly./ N^o^ 20 Callyodon pictus'. 268 × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.15 (133) as Callyodon pictus, one specimen numbered 37. Dryander – Catalogue f.151, sketch with colours, Callyodon —— Society Islands, S. Parkinson.

NOTES: the Solander name Callyodon pictus seems not to have been taken up by subsequent authors.

126.(**2**:43) *Euscarus cretensis* (Linnaeus, 1758) Scaridae

DRAWING: finished water-colour; *r.* [ink] 'Callyodon rubiginosus/Sydney Parkinson pinx^t^ 1768'; *v.* [ink] 'Madera'. 237 × 294.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1 f.216–218v as Callyodon rubiginosum, 'Habitat in Oceano Atlantico prope Insulam Maderam', specimen 5½ inches long. (D. & W. 42) C.S.D. f.239 (266), same data. Dryander – Catalogue f.151 as Callyodon rubiginosus MSS, finished in colours —— Madeira, S. Parkinson.

NOTES: the name *Scarus rubiginosus* was adopted from Solander's manuscript by Valenciennes (1840). Valenciennes cited the vernacular name 'budiam' from Solander's manuscript, or a copy of it, and also referred to the Parkinson drawing.

Other, published, accounts were cited by Valenciennes, but this drawing can be considered to have some standing as type material. The eastern tropical Atlantic parrotfish occurring at Madeira is usually considered to be conspecific with the eastern Mediterranean *E. cretensis*.

127.(**2**:44) *Coridodax pullus* (Bloch & Schneider, 1801) Odacidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Callyodon coregonoides/[ink] S. Parkinson'; *v.* [pencil] 'the Strip on the side silvery the spots on the P.D. & P.A. transparent the membranes of/the tail transparent the spots on the side a purple gray./2 Coregonoides vittatus/[ink] Mattaruwhow'. 294 × 479.

MANUSCRIPT: Solander – (D. & W. 40a) P.A., f.3 and 52 (54) as Coregonoides vittatus. Dryander – Catalogue, not found.

NOTES: there are two entries in the Solander manuscript referring to this species, f.3 refers to two specimens with the serial number B1, and Fig. Pict. at this entry suggests that one of these was the illustrated specimen, while the entry at f.52 appears to have no precise locality and there is no evidence that specimens were preserved on this later occasion.

Solander's name vittatus was published by Richardson (1843*c*) as *Odax vittatus* with an extensive quotation of Solander's manuscript description and reference to Parkinson's drawing. This name is based solely on this source.

The reference by Valenciennes (1839) to *Labrus cyanogaster* Solander from Tahiti does not appear to refer to this species although Whitehead (1968) suggested that it might.

Whitehead (1968) reproduced this drawing at Plate 26, identifying it as *Thalassoma purpurea* (Forsskål, 1775).

128.(**2**:45) *Scarus psittacus* Forsskål, 1775 Scaridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Callyodon/Paguhoo/Toou epatee/[ink] S. Parkinson'; *v.* [pencil] 'The colour on the back turns paler as it goes towards the Belly./N° 10 Labrus ornatus/[ink] Otahite'. 269 × 369.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.54 (174) as Labrus ornatus, one specimen preserved numbered A107 in Cagg 4. Dryander – Catalogue f.151 as Calliodon, sketch with colours —— Society Islands, S. Parkinson.

NOTES: the name Labrus ornatus does not seem to have been employed by later naturalists.

129.(**2**:46) *Upeneichthys porosus* (Cuvier in Cuvier & Valenciennes, 1829) Mullidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson' [in pencil on the mount – 'Upeneus vlamingi Cuv. & Val. t.3. p.453']; *v.* [pencil] 'the part mark'd 2 on the face [the preorbital region] is pale green/The belly pale crimson spotted all over with yellow the spots on the base of the scale somewhat/deeper. the streaks marked x [also on the preorbital region] so on the face, the spotts on the back & on the PD. &

Fig. 10 *Upeneichthys porosus* (Cuvier *in* Cuvier & Valenciennes, 1829). An unfinished Parkinson drawing made off Motuaro, New Zealand. The verso of this sheet bears extensive notes on coloration for the completion of the drawing. (Catalogue number 129.)

PA the/outer circle of the eye & streaks on the tail, ultramarine w^{t} a cast of Purple, the streaks on the face & spots on the back being the deepest./11 Labrus calopthalmus/[ink] off Motuaro'. 269 × 367.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.40 (42), as Labrus calophthalmus, habitat off Motuaro, one specimen preserved numbered B23. Dryander – Catalogue f.153, as Labrus —— sketch with colours, New Zealand, S. Parkinson, the last entry under *Labrus*.

NOTES: this drawing was cited by Cuvier (1829) under the name *Upeneus vlamingii* and he gave a short description of the species based on it. Cuvier reports the locality as Queen Charlotte's Sound.

130.(**2**:47*a*) *Thalassoma pavo* (Linnaeus, 1758) Labridae

DRAWING: finished water-colour; *r.* [ink] 'Labrus lunarius/Sydney Parkinson pinx^{t}. 1768.'; *v.* [ink] 'Madera'. 236 × 295.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.8–11 as Labrus lunaris, Habitat in Oceano Atlantico Insulam Maderam alluente, length 6 inches. (D. & W. 42) C.S.D. f.243 (270), same data. Dryander – Catalogue f.151 as *Labrus lunaris* L., finished in colours, —— Madeira, S. Parkinson.

NOTES: this common Mediterranean and tropical eastern Atlantic Ocean wrasse was confused by Solander with *Labrus lunaris* Linnaeus, 1758, an Indo-Pacific species. His description of the specimen was very detailed.

131.(**2**:47*b*) *Thalassoma lutescens* (Lay & Bennett, 1839) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Labrus lorius mss./Epaou pararoute/[ink] S. Parkinson'; *v.* [pencil] 'N° 58. Labrus lutescens/[ink] Otahite'. 238 × 295.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.49 (169) as Labrus lutescens, one specimen numbered A96 in Cagg 4. Dryander – Catalogue f.151 as sketch with colour, Labrus lorius Brouss. —— Society Islands, S. Parkinson.

NOTES: the Solander name was employed by Lay & Bennett (1839) in their description of *Julis lutescens* quoting extensively from Solander's manuscript account. With permission (presumably of Robert Brown although this was not stated) they reproduced the Parkinson drawing as their Plate XIX, Figure 2; the drawing being finished by the completion of fin rays in the fins and scales on the body (the original has only samples of both shown). They did not, however, add the pelvic fins which were omitted in Parkinson's drawing although mentioned by Solander. Lay and Bennett's text was prepared at least nine years before publication. Therefore the Parkinson drawing must have been copied around 1830 (Beechey, 1839).

This drawing was reproduced by Whitehead (1968) as Plate 27, labelled *Thalassoma lunaris* (Linnaeus, 1758).

132.(**2**:48) *Thalassoma quinquevittata* (Lay & Bennett, 1839) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Paöou-marouruh/páou-móurúrá/[ink] S. Parkinson'; *v.* [pencil] 'N° 8 [ink] Labrus formosus/Otahite'. 270 × 369.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.108 (228), as Labrus formosus, two specimens preserved, numbered A169 and A189, both in Cagg 6. Dryander – Catalogue f.152–3 not identifiable among the ten Parkinson drawings of *Labrus* made at the Society Islands.

NOTES: this drawing was cited by G. T. Lay & E. T. Bennett (1839) as *Labrus formosus*, Sol. MSS in their description of *Scarus quinque-vittatus*, which was based, however, solely on a drawing made by Beechey during the voyage of the *Blossom*. Their account was written before 1830 (Beechey, 1839). Valenciennes (1839) also referred to this drawing, but wrongly attributed it to Forster, as Günther (1862) has already pointed out, in his account of *Julis erythrogaster*; a name which occurs in the Solander manuscripts as *Labrus vittatus erythrogaster* f.7 (119). Günther regarded

this, *Labrus vittatus cyanogaster*, and *L. formosus* as varieties of *Julis trilobata* (Lacepède, 1802) and clearly consulted the drawings and manuscripts to reach this decision. There were no specimens extant in the British Museum collection which could have been associated with the *Endeavour* collection (Günther, 1862).

133.(**2**:49) *Thalassoma hardwickei* (Bennett, 1829) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Paäehoe/Epàoū maraoùrā [ink] S. Parkinson'; *v.* [pencil] 'The eyes gold colour & the pupil black – the P.P. transparent the [spots – deleted] stripes on the back soften'd in. – /N° 30. Labrus pulcherrimus/[ink] Otahite'. 237 × 295.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.6*, (121) as Labrus pulcherrimus, apparently four specimens preserved numbered A.18, A.119, and A.153 (two fishes) in Caggs 1, 5, and 6 respectively. Dryander – Catalogue f.152–3 not identifiable among the ten Parkinson drawings of *Labrus* made at the Society Islands.

NOTES: Solander's name Labrus pulcherrimus seems not to have been taken up by any later author.

134.(**2**:50*a*) *Paracirrhites forsteri* (Bloch & Schneider, 1801) Cirrhitidae

DRAWING: unfinished water-colour; *r.* [ink] Cirrhites forsteri/[pencil] perca cruenta mss Seb. thes. 3 tab. 27 n.12./Taiboo/Ideeiaio/[ink] S. Parkinson'; *v.* [pencil] 'N° 42 Labrus rufus/[ink] Otahite'. 250 × 331.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.53 (173) as Labrus rufus, one specimen preserved, numbered A.97 in Cagg 4. Dryander – Catalogue f.153, as Labrus, in pencil Perca cruenta Brouss. —— Society Islands, S. Parkinson, sketch with colours.

NOTES: the name Labrus rufus Solander seems not to have been adopted by any later naturalist possibly because it was a homonym of *Labrus rufus* Linnaeus, 1758. However, Broussonet's manuscript name Perca cruenta has received considerable usage and resulted in confusing the history of the earliest collected hawk-fishes in that all of them from both first and second Cook voyages were renamed alike. Specimens in the British Museum from the Old Collection were listed by Günther (1860) as *Perca cruentata* and Wheeler (1981) showed that one of these is probably Forster's *Resolution* specimen and thus the type specimen of this species. The second of Günther's specimens was referred to *Cirrhites arcatus* at a later date. A specimen of *Paracirrhites* in the Muséum National d'Histoire Naturelle, Paris (MNHN–A.2912) S.L. 102 mm (T.L. 121), was accessioned as *Cirrhites maculatus* = *Perca cruenta* Broussonet (Bauchot, 1969) and may possibly be the *Endeavour* specimen.

135.(**2**:50*b*) *Halichoeres radiatus* (Linnaeus, 1758) Labridae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Buchan'; *v.* [pencil] 'N° 14 Labrus/[ink] Brasil'. 241 × 326.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.151 as finished in colours, Labrus —— Brasil, Buchan.

NOTES: as this fish appears not to have been described or named by Solander the drawing has not been referred to by later naturalists.

136.(**2**:51*a*) *Stethojulis bandanensis* (Bleeker, 1851) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Labrus Taeniatus mscr./cfr typ. specimen,/perh. new species/Pauuhe/[ink] S. Parkinson'; *v.* [pencil] 'N°. 53 Labrus aulicus/[ink] Otahite'. 247 × 333.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.62 (182), as Labrus aulicus, vernacular names, apparently three specimens numbered A.114, A.154, and A.115 preserved in Caggs 5 and 6 (the two last); a fourth entry to A.115 is deleted possibly because it suggested the specimen was in Cagg 5 not 6. Another reference to Labrus aulicus occurs on f.90 (210) of P.A.O.P. but is deleted and vittatus erythrogaster substituted. Labrus taeniatus occurs on f.51 (171) of P.A.O.P. as a Solander name, but the name on the drawing probably refers to an independent usage by Broussonet. Dryander – Catalogue f.151 as sketch with colours, Labrus taeniatus Brouss. —— Society Islands, S. Parkinson.

NOTES: Solander's name Labrus aulicus seems not to have been adopted by later naturalists, nor apparently was Labrus taeniatus. This latter name was proposed by Broussonet (see Dryander Catalogue entry, above) and presumably he wrote it on the drawing. It too was never published.

137.(**2**:51*b*) *Pagellus bogaraveo* (Brunnich, 1768) Sparidae

DRAWING: finished ink drawing by A. Buchan; *r.* [pencil] 'Positio squamarum non recte./[ink] Labrus [deleted] Sparus [inserted in pencil] griseus/[pencil] Sp. Bogaraveo Brunn. ich mass./p.49/[ink] Buchan'; *v.* [ink] 'Madeira'. 186 × 271.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 1, f.200–203 as Sparus griseus, habitat in Oceano Maderae, length 4 inches; (D. & W. 42) C.S.D. f.233 (260), same data. Dryander – Catalogue f.149 Sparus – no entry for this drawing.

NOTES: the name Sparus griseus Solander was never taken up by later naturalists, and it seems that at an early date (the annotation may be Broussonet's) this drawing and Solander's description may have been recognized as a juvenile of the red sea-bream, *Pagellus bogaraveo*.

This drawing was reproduced by Whitehead (1968) as Plate 30B.

138.(**2**:52) *Nemadactylus macropterus* (Bloch & Schneider, 1801) Cheilodactylidae

DRAWING: unfinished water-colour; *r.* [pencil] 'N.B./Sparus Carponemus mss/[ink] S. Parkinson'; *v.* [pencil] '3 Sciaenoides abdominalis/[ink] Mattaruwhow'. 270 × 371.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.29 (31) and f.9 (11), as Sciaena abdominalis both with Fig. Pict. showing that the species was drawn twice (see

number 123, this catalogue). Dryander – Catalogue f.155 presumably the second sketch with colours from New Zealand by S. Parkinson under the heading (four lines above) in pencil Sparus carponemeus Brouss.

NOTES: Sciaena abdominalis was figured and described twice in Solander's Pisces Australiae. At f.9 (11) he recorded the locality as off Cape Kidnappers, a name used in addition to Mattaruwhow (near the present Napier, East coast of North Island). At f.29 (31) he recorded the locality as Motuaro Bay and the date as 24 November 1769 (thus in Huraki Gulf, towards the north of North Island). This drawing therefore appears to have been the first of the two produced. It was reproduced by Whitehead (1968) as Plate 20.

The other drawing (number 123 in this catalogue) is labelled Queen Charlottes Sound (north end of South Island) but if the Solander manuscript localities are correct (and there is no reason to doubt this) then Queen Charlottes Sound is an incorrect locality. This suggestion is more probable than there being an error in Solander's manuscripts as these localities were added to the drawings by Dryander long after the voyage.

Cuvier (1830) used the name *Cheilodactylus carponemus*, deriving it from the Parkinson drawing, which he cited. As he quoted Queen Charlotte Sound as a locality there is no doubt that he was referring to the other drawing (number 123) which has this incorrect locality. Whitehead (1968) was misled by the confusion between the names and localities and claimed that the present drawing was part of the type materials for *C. carponemus*. The point is not important as *C. carponemus* was based largely on the drawings of G. A. Forster (one of which was made at Queen Charlotte's Sound) and J. R. Forster's description which was used by Schneider for the sole basis of his *Cichla macroptera* (see Wheeler, 1981). Cuvier's name is thus best regarded as a junior objective synonym of *Nemadactylus macropterus* (Bloch & Schneider, 1801). This drawing is discussed and Solander's manuscript quoted extensively by Richardson (1842*b*).

139.(**2**:53) ?*Diplodus caudimaculata* (Poey, 1861) Sparidae

DRAWING: unfinished water-colour; *r.* [pencil] '(Sparus latus/plumbeus [written above this] Catalogue)/[ink] S. Parkinson/[pencil] Labrus plumbeus/sent from Jamaica by Shakespear/11. New Zealand Sparus vel Sciena'; *v.* [pencil] 'N°. 13. Labrus/[ink] Brasil'. 295 × 457.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.151 as sketch with colours, Labrus —— Brasil, S. Parkinson, probably refers to this drawing.

NOTES: the absence of a trivial name on this drawing makes it impossible to check in the Solander manuscripts; indeed, it is probable that Solander did not describe this fish (other Brazilian specimens were drawn but not described). The annotations on the drawing are confusing. I believe that those on the verso are the original notes, except that 'Brasil' was added by Dryander. It is possible that the note 'Sparus latus, plumbeus Catalogue' is in the hand of Broussonet. I do not recognize the small, neat hand referring to '11. New Zealand Sparus vel Sciena', nor 'Labrus plumbeus sent

from Jamaica by Shakespear'. Roger Shakespear was employed by Banks as a collector of plants; he also sent many specimens of Jamaican fishes to the British Museum where they were examined and described by Solander (Dawson, 1958; Wheeler, 1984).

I interpret the later annotations as follows. The note labelling this Sparus latus possibly by Broussonet was an error in attempting to identify this fish with Solander's ms Sciena lata (see no. 161, this catalogue), but this led to the locality of New Zealand from a later note writer. The reference to Shakespear's Jamaican Labrus plumbeus can be seen merely as a comparison with a specimen received from that collector either when it came to England or already in the British Museum.

140.(**2**:54) *Parapercis colias* (Bloch & Schneider, 1801) Mugiloididae

DRAWING: unfinished water-colour; *r.* [pencil] 'Perca ? colias/[ink] S. Parkinson'; *v.* [pencil] '7 Labrus macrocephalus/[ink] Motuaro'. 293 × 479.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.26 (28), as Labrus macrocephalus, 'cole fish nostratibus'. Dryander – Catalogue f.153, as sketch with colours, Labrus —— New Zealand, S. Parkinson.

NOTES: the Solander name Labrus macrocephalus does not seem to have been taken up by later authors. This species was named from the description made by J. R. Forster on the *Resolution* voyage; Cuvier (1829) referred to the drawing by G. A. Forster of this specimen in Banks's collection but made no reference to the Parkinson drawing from the *Endeavour* voyage. This drawing was referred to by Richardson (1843*a*, 1843*b*); in the latter reference he quoted from Solander's manuscript and compared the description and figures from both the *Endeavour* and *Resolution* voyages.

141.(**2**:55) *Cheilinus trilobatus* (Lacepède, 1802) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Epupoi/[ink] S. Parkinson'; *v.* [pencil] 'The finns & tail are all strew'd over wt small white spots/every scale is tip'd more or less wt the pink Colour – the darker/red spots are dropt here & there throughout the whole body/74 Labrus cruentus/[ink] Ulhietea'. 273 × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.131 (251) as Labrus cruentatus, one specimen preserved, numbered A.201, 'Habitat in Oceano pacifico prope Insulam Ulhaietea'. Dryander – Catalogue f.152–3, not distinguishable among the numerous entries Labrus —— Society Island, S. Parkinson.

NOTES: the Solander name does not seem to have been used by later workers.

142.(**2**:56) *Cheilinus trilobatus* (Lacepède, 1802) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Marrarra/[ink] S. Parkinson'; *v.* [pencil] 'the green in the P.D. & P.A. turns very dark toward the bottom./68/[ink] Ulhietea'. 270 × 371.

MANUSCRIPT: Solander – not found. Dryander – Catalogue not found.

NOTES: as there is no manuscript name on this drawing it is not possible to identify it in Solander's manuscript. However, there were only five species of fish recorded from Ulhaietea (= Raiatea) including the Labrus cruentatus noted above (no. 141, this catalogue). It may be that the two fish were caught close together in time and both were drawn but only one described. The manuscript list of specimens (P.A.O.P. f. 292) records only the single specimen preserved as noted above. It is not now in the collection of the British Museum (Natural History).

143.(**2**:57) *Thalassoma purpureum* (Forsskål, 1775) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Pao-Manulka/[ink] S. Parkinson/[in ink on mount] see Julis quadricolor Lesson Voy Coq:t'; *v.* [pencil] 'The green a deal brighter as if done wt Verdigrease & yellow upon the back two or three fascia of/green clear. the colours must be sweetten'd in dark purple brown on the back the edges of the/scales here & there green./This drawing alter'd the red brighter where the black lead mark is on the/head a fine rose colour the greens more blue./N° 17 Labrus vitatus/Cynogaster [written above vittatus] [ink] Otahite'. 269 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f. 12 (128), as Labrus vittatus cyanogaster from George Land (= Tahiti), it is uncertain how many specimens were preserved, 3 according to the index f.(285). Dryander – Catalogue f. 151–3 not recognizable among the numerous Labrus —— drawn by Parkinson in the Society Islands.

NOTES: Günther (1862) referred to the Parkinson drawings and the Solander manuscript and corrected Valenciennes (1839) who had wrongly attributed this and two other drawings to G. Forster. However, Günther considered that Solander had had three samples of what he called *Julis trilobata* (Lacepède, 1802) which had been unnecessarily recognized as three taxonomic forms, *Labrus formosus* (see no. 132, this catalogue), *Labrus vittatus cyanogaster* (this drawing), and *Labrus vittatus erythrogaster*, originally Labrus aulicus (no. 144, this catalogue). The concept of subspecies which Günther attributed to Solander in this way was unknown to Solander and the trinomials are a misreading and misunderstanding of Solander's attempt to change the name of *Labrus vittatus* to *Labrus cyanogaster*, and to *L. erythrogaster* for no. 136.

This drawing served as the basis for *Julis cyanogaster* Valenciennes, in Cuvier & Valenciennes, 1839, a name which he attributed to Solander even though he assumed the painting was by Forster.

144.(**2**:58) *Thalassoma fuscum* (Lacepède, 1802) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Epóu páá/[ink] S. Parkinson'; *v.* [pencil] 'Labrus vitatus/The iris yellowish green the pupil black/N° 9 Labrus [aulicus – deleted] vittatus erythrogus [added]/[ink] Otahite'. 268 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f. 90 (210) as Labrus aulicus, which deleted and vittatus/erythrogaster substituted; one specimen numbered

A.149, in Cagg number 5. Dryander – Catalogue f.151–3, presumed to be one of several drawings of Labrus —— by Parkinson from the Society Islands.

NOTES: this drawing and the Solander manuscript were examined by Günther (1862). No later naturalist appears to have used Solander's names.

145.(**2**:59) *Halichoeres trimaculatus* (Quoy & Gaimard, 1834) Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Epou taa taa/[ink] S. Parkinson'; *v.* [pencil] 'N° 25 Labrus osmeroides/[ink] Otahite'. 272 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.5 (117) as Labrus osmeroides, locality George Land (= Tahiti), two specimens numbered A.8 and A.108. Dryander – Catalogue f.151–3, presumed to be one of several drawings of Labrus —— by Parkinson from Society Islands.

NOTES: Solander's name Labrus osmeroides seems not to have been used by later naturalists.

146.(**2**:60) *Variola louti* (Forsskål, 1775) Serranidae

DRAWING: unfinished water-colour; *r.* [pencil] 'P. Rosea mss. Perca Louti forsk. fn. arab. p.40. n.40/Ehowau'; *v.* [pencil] 'N° 1 Perca rosea/[ink] Otahite'. 298 × 476.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.35 (153) as Perca rosea, one specimen numbered A.69 in Cagg 3. Dryander – Catalogue f.157 as sketch with colours, Perca rosa Brouss —— Society Islands, S. Parkinson.

NOTES: this drawing is the sole source for Cuvier's (1828) *Serranus roseus* which is briefly described from a Parkinson drawing from Tahiti. As an exception to his usual practice Cuvier does not credit the name to Solander, nor does he refer to Solander's manuscript.

There are no specimens in the British Museum (Natural History) which can be associated with the *Endeavour* voyage.

147.(**2**:61) *Epinephelus fasciatus* (Forsskål, 1775) Serranidae

DRAWING: unfinished water-colour; *r.* [ink] 'Serranus fasciatus, Forsk./[pencil] Whapoo/Matapoo-Ohôå/[ink] S. Parkinson'; *v.* [pencil] 'N° 59. Perca rubescens/[ink] Otahite'. 269 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) (P.A.O.P. f.123 (243) as Perca rubescens, two specimens, one unmarked, the other numbered A.186 in Cagg 6. Dryander – Catalogue f.157–9, presumed to be one of seven unfinished water-colours of *Perca* —— by Parkinson in the Society Islands.

NOTES: the Solander name Perca rubescens does not appear to have been taken up by later naturalists.

A specimen of *Epinephelus fasciatus* in the Muséum National d'Histoire Naturelle, Paris, which originated in Banks's collection and was given to Broussonet is believed to be a specimen collected on the *Resolution* voyage by J. R. Forster (Bauchot, 1969; Wheeler, 1981).

148.(**2**:62) *Monotaxis grandoculis* (Forsskål, 1775) Pentapodidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Spharodon grandoculis/an Perca Gobioides mss/Emoco/[ink] S. Parkinson'; *v.* [pencil] 'N^{o} 12 Sciaena cyprinacea [ink] Otahite'. 273 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.67 (187) as Sciaena cyprinacea, vernacular name, length 16 inches. Dryander – Catalogue f.155, presumed to be one of seven drawings by Parkinson from the Society Islands labelled Sciaena.

NOTES: Solander's index to the P.A.O.P. (f.290) shows that no specimen of Sciaena cyprinacea was preserved. Solander's manuscript name does not appear to have been taken up by any later naturalist. Perca gobioides does not appear in the Solander manuscript and was probably a Broussonet name.

149.(**2**:63*a*) *Holocentrus ascensionis* (Osbeck, 1765) Holocentridae

DRAWING: finished water-colour; *r.* [ink] 'Sciaena rubens./Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Nov^{r}. 8. 1768/Coast of Brasil'. 258 × 324.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.34–37 as Sciaena rubens, 'Habitat . . . a territoria Spiritus Sancti Brasiliae'; specimen 8½ inches long. (D. & W. 42) C.S.D. f.249 (276), same data.

NOTES: Solander's name Sciaena rubens does not appear to have been adopted by any later naturalist.

150.(**2**:63*b*) *Centracanthus cirrus* Rafinesque, 1810 Emmelichthyidae

DRAWING: finished water-colour, with ink detail of head with jaws extended; *r.* [ink] 'Sciaena angustata./Sydney Parkinson pinx^{t}. 1768.'; *v.* [ink] 'Madeira'. 234 × 293.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.27–29 as Sciaena angustata, 'Habitat in Oceano Atlantico prope insulam Maderam'; specimen 7 inches long. (D. & W. 42) C.S.D. f.245 (272), same data.

NOTES: the name *Sciaena angustata* was adopted by Valenciennes (1830) and published as *Smaris angustatus*, based on this drawing although Solander was credited as the author. This drawing therefore has some type standing.

Two separate specimens labelled *Smaris insidator* with no provenance were listed by Günther (1859) and might have been *Endeavour* specimens. Unfortunately they were both placed in the one bottle in the early twentieth century and that bottle was recently broken, so it is impossible to verify this conjecture.

151.(**2**:64*a*) *Lutjanus semicinctus* Quoy & Gaimard, 1824 Lutjanidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Perca coregona mss/[ink] S. Parkinson'; *v.* [pencil] 'Sciena vittata/[ink] Princes Island'. 248 × 332.

MANUSCRIPT: Solander – not traced (see below and entry 152). Dryander –

Catalogue f.155, under Sciaena, listed as Perca coregona Brouss. —— sketch with colours, Princes Island, S. Parkinson.

NOTES: there is no record of Sciaena vittata in the Solander manuscript Animalia Javanesis et Capensis (D. & W. 40d) in which it should have been included if Dryander's locality, Princes Island, is correct. Sciaena vittata is included in the manuscript describing the fishes and other animals from the Pacific Ocean (D. & W. 40c) – see number 152, this catalogue. Clearly the two drawings represent different taxa but the use of the same name is inexplicable.

Solander's name Sciena vittata seems never to have been employed by other naturalists although Lacepède (1802) published the same name apparently deriving it from Commerson's manuscript. The entry in Dryander's catalogue attributes the name Perca coregona to Broussonet but this also has not been taken up by later authors.

152.(**2**:64*b*) *Sargocentron diadema* (Lacepède, 1799) Holocentridae

DRAWING: unfinished water-colour; *r.* [pencil note by anal fin of fish] 'deep carmin/ [pencil] Ee-chi [ink] S. Parkinson'; *v.* [pencil] 'N° 38 Sciena vittata/[ink] Otahite'. 256 × 329.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.24 (142), locality Tahiti, serial number A.59 but not preserved (see f.287). Dryander – Catalogue f.155, possibly the drawing identified as Holocentrus macrophthalmus Brouss. —— Society Islands, S. Parkinson; otherwise any one of three *Sciaena* drawings from the same locality.

NOTES: Solander's name Sciena vittata seems not to have been used by later naturalists, but see discussion under number 151 in this catalogue.

153.(**2**:65) *Aplodactylus arctidens* Richardson, 1839 Aplodactylidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sciena Meandrites mss/Sciaena [ink] S. Parkinson'; *v.* [pencil] 'the whole back of this fish & the finns a Green gray Speckled wt black/The ground colour gradually turning pale towards the belly./ N° 1 Meandrites/[ink] Mattaruwhow'. 298 × 470.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.2 (4) as Meandrites, Habitat prope Cape Kidnappers; f.68 index entry only. Dryander – Catalogue f.157 under pencil genus heading Meandrites sketch with colours, Sciaena Meandrites Brouss. —— New Zealand, S. Parkinson.

NOTES: Richardson (1842*b*) quoted Solander's manuscript account of Sciaena meandratus in the discussion of his description of the species *Aplodactylus arctidens*, opening his quotation with the comment that 'The first example of this genus was discovered by Solander on the coast of New Zealand, and named by him "Sciaena maeandratus." . . .'. Nowhere does he state or imply that this was a proposal of a new name. Despite this many authors have used the name *Sciaena maeandratus* as if it was proposed as a valid binomen, for example Whitehead (1968) who claims the Parkinson drawing was the basis for *Aplodactylus meandratus* Richardson, 1842.

However, Richardson (1843*a*) also quotes his earlier paper as if the Solander name was validly proposed; here too he refers to the drawing, as he does also in Richardson (1843*b*).

This drawing was reproduced by Whitehead (1968) as Plate 19.

154.(**2**:66) *Latridopsis ciliaris* (Bloch & Schneider, 1801) Latridae

DRAWING: pencil sketch; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The upper side of the fish dark grey losing itself by degrees in a silvery colour the/finns & tail dark grey./ 19 Sciena salmonea/[ink] Totarranue'. 288 × 475.

MANUSCRIPT: Solander – not described but listed as Sciena salmonea at P.A. index (f.72) as two specimens (D. & W. 40a). Dryander – Catalogue f.155–7, presumably one of the seven drawings of Sciaena —— made by Parkinson at New Zealand.

NOTES: this species was described by Schneider from J. R. Forster's manuscript notes made on the *Resolution* voyage.

Solander's name Sciena salmonea does not appear to have been used by later naturalists.

This drawing was cited by Richardson (1842*b*) in his discussion of the previously undescribed genus *Latris*.

155.(**2**:67) *Arripis trutta* (Bloch & Schneider, 1801) Arripidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sciaena mulloides mss/[ink] S. Parkinson'; *v.* [pencil] '9. Mulloides sapidissimus/[ink] Opoorage'. 330 × 461.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.17 (19), as Mulloides sapidissimus, habitat Tegadu, Tolaga, one specimen numbered B.26; also (f.68) index, where the serial number is not recorded. Dryander – Catalogue f.155 as Sciaena mulloides Brouss. —— sketch with colours, New Zealand, S. Parkinson.

NOTES: Solander's name Mulloides sapidissimus was published as a reference in synonymy by Richardson (1843*b*) who referred both to the manuscript and the Parkinson drawing under his name *Centropristes sapidissimus*. Richardson noted the differences in the localities cited by Solander and Parkinson. Richardson (1842*b*) also discussed the drawing and manuscript and quoted extensively from the latter.

This species was first named by Schneider from J. R. Forster's manuscript notes made on the *Resolution* voyage. Although Cuvier (1828) refers to G. A. Forster's drawing of *Sciaena trutta* in Banks's collection and had had the drawing copied he appeared to be unaware of the Parkinson drawing.

This drawing was reproduced by Whitehead (1963) at Plate 10.

156. (**2**:68) *Arripis trutta* (Bloch & Schneider, 1801) Arripidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sciaena mulloides./Hekāwai/ [ink] S. Parkinson'; *v.* [pencil] '9 Mulloides sapidissimus/[ink] Queen Charlotts Sound'. 298 × 279.

MANUSCRIPT: see number 155.

NOTES: Richardson (1842*b*) referred to this drawing within the discussion of *Centropristes salar* Richardson, 1839, but there is no evidence there that Richardson intended the name *Centropristes mulloides* to be read as a valid binominal (indeed the combination nowhere appears in that paper). Despite this some authors seem to have regarded it as the proposal of a new name including Richardson (1843*a*, *b*) himself. In the first of these two references Richardson cites this drawing by number.

157.(**2**:68–69) ? *Centropomus undecimalis* (Bloch, 1792) Centropomidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sciaena'; *v.* [pencil] 'N^{o} 18. Gadoides/[ink] Brasil'. 268 × 374.

MANUSCRIPT: Solander – not traced. Dryander – not traced. See Notes below.

NOTES: the absence of a binominal name makes it impossible to trace this drawing in the manuscripts. In fact, Sciaena gadoides does occur in P.A. f.42 (44) (D. & W. 40a) but refers to a fish with Habitat off Motuaro, New Zealand. If the locality on the drawing is correctly attributed by Dryander this name and description cannot refer to this drawing.

The drawing is very imperfect; its style is uncertain and it is difficult to attribute it to an artist. If the locality, Brazil, is correct it is possibly by Buchan and in some respects it has similarities with his uncertain line and colouring. It may, however, be by Parkinson. It is noteworthy that Dryander did not certainly attribute it to any artist.

The identification of the drawing is uncertain. The Brazilian locality suggests *Centropomus*, but it is not an accurate representation of that species, and certain features suggest it might be a sciaenid.

158.(**2**:69) *Anisotremus surinamensis* (Bloch, 1791) Sparidae

DRAWING: finished water-colour; *r.* [pencil] 'Perca [written above as a substitute for Sciaena]/[ink] Sciaena labiata/S. Parkinson'; *v.* [ink] 'Brasil'. 295 × 462.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.30–33, as Sciaena labiata, Habitat in Brasilia, length 20 inches; (D. & W. 42) C.S.D. 247 (274), same data. Dryander – Catalogue f.155 as Sciaena labiata mss, finished in colours, Brasil, S. Parkinson.

NOTES: Solander's name Sciaena labiata does not appear to have been employed by any later naturalist.

159.(**2**:70) *Sargocentron tiere* (Cuvier in Cuvier & Valenciennes, 1829) Holocentridae

DRAWING: unfinished water-colour; *r.* [pencil] 'holocentrus macrophthalmus/[ink] S. Parkinson'; *v.* [pencil] 'the whole fish of a bright carmine colour somewhat paler before as are the spines/the spots on the P.D. white the first circle of the eye purple 2nd red pupil black/N^{o} 43 Sciaena rubra/[ink] Otahite'. 267 × 372.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.24 (142) as Sciaena rubra,

serial number A.58; (f.287) index and list of specimens collected, suggests that no specimen was preserved. Dryander – Catalogue f.155, originally as Sciaena but with Holocentrus macrophthalmus Brouss. pencilled in, sketch with colours, Society Islands, S. Parkinson.

NOTES: the name Sciaena macropthalma occurs in Solander's manuscript P.A.O.P. at f.9 (123), and the entry is cross-referred to that for Sciaena rubra. It seems from the evidence of Dryander's Catalogue that Broussonet considered them identical and wrote the name S. macropthalma on the recto of the drawing. Neither name appears to have been used from Solander's manuscript by later naturalists, although when *Sciaena rubra* Bloch & Schneider, 1801, was used it was an independent proposal.

160.(**2**:71) *Pterocaesio tile* (Cuvier in Cuvier & Valenciennes, 1830) Lutjanidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sciaena melanura mscr./Aaur-èoorè/[ink] S. Parkinson'; *v.* [pencil] 'N°. 40. Laveratoides amaenus/[ink] Otahite'. 271. × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.48 (166), as Lavaretoides amaenus, vernacular name, one specimen 'unmark'd' in Cagg 6. Dryander – Catalogue f.155–6 not identified by name amongst the *Sciaena* species; Lavaretoides is not entered in the catalogue.

NOTES: Solander's name Lavaretoides amaenus does not appear to have been employed by later naturalists, nor does Sciaena melanura which is believed to be a Broussonet name. Cuvier (1830) in describing the species *Caesio tricolor* refers to a Parkinson drawing in the Banks collection captioned *Sciaena*. This is the only *Caesio* (s.l.) drawing in the collection and may be the one referred to, although the description of the coloration does not entirely agree (however, it has to be stressed that Cuvier was working from a copy of the drawing, not the original).

161.(**2**:72) *Pagrosomus auratus* (Houttuyn, 1782) Sparidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Sparus erythrinus Linn ? [ink] S. Parkinson'; *v.* [pencil] 'on the back ar a number of silvery spots with a blue cast./6 Sciena lata/[ink] Oahoorage'. 290 × 475.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.22 (24), as Sciena lata, habitat coast near Opuragi and Oouhuragi (Mercury Bay and Hauraki Gulf). Dryander – Catalogue, not identifiable amongst the two *Sparus* and four *Sciaena* drawings at ff.149 and 155.

NOTES: Solander's description was quoted extensively by Richardson (1842*a*) in establishing his species *Pagrus latus*; the Parkinson drawing was also discussed and has standing as type material. Richardson also referred to G. Forster's drawing labelled *Sciaena aurata*, made on the *Resolution* voyage, the description of which formed the basis of *Labrus auratus* Bloch & Schneider, 1801 (Wheeler, 1981). The identification written on the recto of the drawing *Sparus erythrinus* Linn ? was

probably written by Broussonet who associated this drawing with this European seabream.

This drawing is reproduced by Whitehead (1968) as Plate 13.

162.(**2**:73) *Plectorhynchus picus* (Cuvier in Cuvier & Valenciennes, 1830) Pomadasyidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Perca scelerata ms/Abootoo/[ink] S. Parkinson'; *v.* [pencil] 'N°. 15 Labrus punctatus/[ink] Otahite'. 268 × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.44 (162) as Labrus punctatus; (f.289) no specimen preserved. Dryander – Catalogue f.151 as *Labrus*, pencil addition Perca scelerata Brouss. —— sketch with colours, Society Islands, S. Parkinson.

NOTES: the Solander name Labrus punctatus seems not to have been used by later naturalists, probably because it was preoccupied by *Labrus punctatus* Linnaeus, 1758. Perca scelerata, written on the recto of the drawing, is one of Broussonet's numerous annotations.

The drawing which Cuvier referred to in his description of *Diagramma pica* is listed at number 167 in this catalogue.

163.(**2**:74) *Polyprion oxygenios* (Bloch & Schneider, 1801) Percichthyidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Perca Gadoides mss./[ink] S. Parkinson'; *v.* [pencil] '13. Sciaena gadoides/[ink] Motuaro'. 298 × 489.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.42 (44) as Sciaena gadoides, habitat off Motuaro, no serial number, not preserved (f.72), total length 27 inches. Dryander – Catalogue f.157 as Sciaena, pencil addition Perca gadoides Brouss. —— sketch with colours, New Zealand, S. Parkinson.

NOTES: *Epinephelus oxygenios* was proposed by Schneider (1801) from the description made by J. R. Forster on the *Resolution* voyage of a specimen from Queen Charlotte's Sound, New Zealand. However, Schneider did not see the drawing which was in Banks's collection in London (Wheeler, 1981). This drawing was copied by Mrs S. Bowdich and Cuvier (1829) referred to it, but made no reference to the Parkinson drawing of the same taxon. Neither Solander's name Sciaena gadoides nor Broussonet's amendation to Perca gadoides seem to have been used by later naturalists.

164.(**2**:75*a*) *Lutjanus kasmira* (Forsskål, 1775) Lutjanidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Eta äpà/[ink] S. Parkinson'; *v.* [pencil] 'There is/some of this fish much larger/N°. 39. Perca vittata/[ink] Otahite'. 249 × 344.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.16 (134) as Perca vittata, several specimens, perhaps 5 in Cagg 4 numbered A.38, and two 'unmark'd' in Cagg 6. Dryander – Catalogue not identified by species, one of several *Perca* from the Society Islands drawn by Parkinson.

NOTES: Solander's name Perca vittata seems not to have been adopted by later naturalists. There are two specimens listed by Günther (1859) under *Genyroge bengalensis* specimens d, and e, 'Adult India Old Collection'; they might be from the *Endeavour* voyage, but are as likely to be from the *Resolution* voyage (see Wheeler, 1981).

165.(**2**:75*b*) *Epinephelus merra* Bloch, 1793 Serranidae

DRAWING: finished water-colour; *r.* [ink] 'Serranus hexagonatus/[pencil] Etaràaò op appah/[ink] S. Parkinson'; *v.* [pencil] 'Tarão The ground colour & the spots are darker & soften'd in to one another round about each spot/are small dots of white or straw colour – the same across the finns. there is of this fish as large again/N° 36. Perca maculata/[ink] Otahite'. 244 × 356.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.30 (148) as Perca maculata, three specimens two numbered A.65, and one A.127; f.288 confirms that three specimens were preserved. Dryander – Catalogue ff.157–8 presumed to be one of several entries under *Perca* —— of drawings made at Tahiti by Sydney Parkinson.

NOTES: this drawing was the basis of Valenciennes's (1829) *Serranus Parkinsonii* the name and description being derived from the drawing alone. The name *Perca maculata* was used by J. R. Forster in his manuscript account of the *Resolution* animals (Forster, 1844) but applies to the species *Epinephelus fasciatus* (Forsskål, 1775), see Wheeler (1981) for discussion. There are two specimens in the British Museum (Natural History) which may be *Resolution* specimens, and a third in the Muséum National d'Histoire Naturelle, Paris, received by Cuvier from Broussonet and originally coming from Banks (Wheeler, 1981; Bauchot, 1969). The Paris specimen and the London specimens might have come from either the *Endeavour* collection or the *Resolution*, or both.

This drawing was reproduced by Whitehead (1968) as Plate 12.

166.(**2**:76) *Paracirrhites arcatus* (Cuvier in Cuvier & Valenciennes, 1829) Cirrhitidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N° 26. Perca areata/[ink] Otahite'. 268 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) f.27 (145), as Labrus areatas, one specimen serial number A.64; f.107 (227) as Perca areata, two specimens with serial number A.167; also indexed f.288. Dryander – Catalogue ff.158–9 not identified by name amongst the *Perca* —— entries for drawings from the Society Islands by Parkinson.

NOTES: Cuvier (1829) based his name *Cirrhites arcatus* partly on this Parkinson drawing, but had a specimen and another drawing as well. He derived the species name from the copy of the drawing provided by Mrs S. Bowdich, who had erroneously copied the Solander name 'Perca areata' as *Perca arcata*. This discrepancy was noted by Richardson (1848) who quoted extensively from the Solander manuscript citing both accounts and differentiating by their serial numbers (A.64 and A.167).

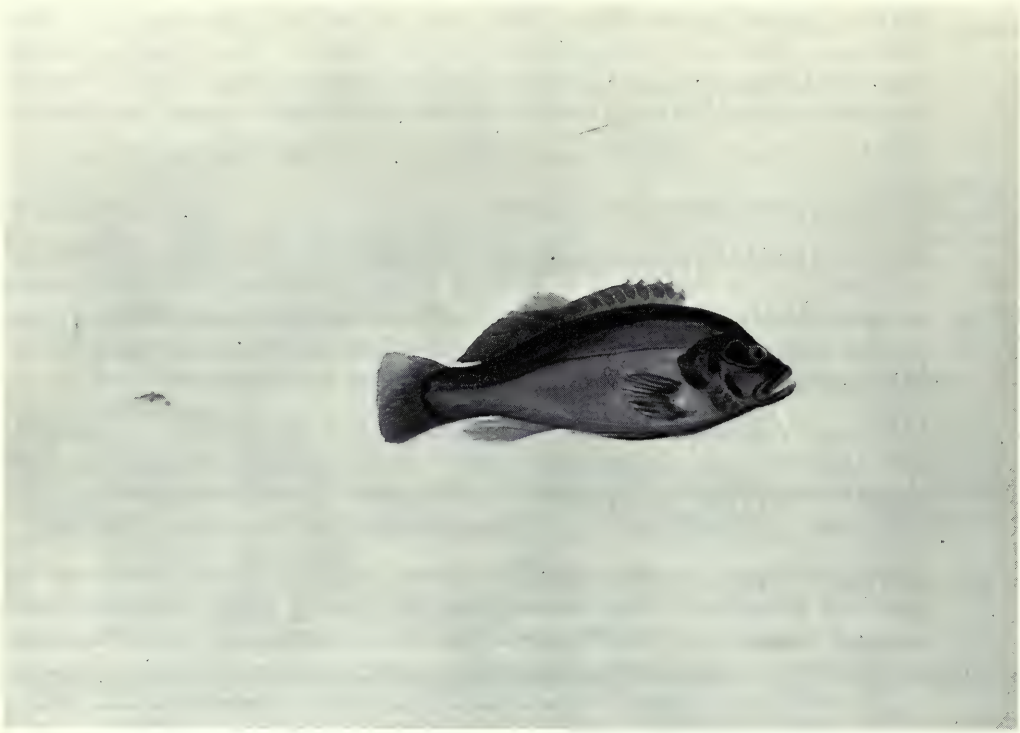

Fig. 11 *Paracirrhites arcatus* (Cuvier *in* Cuvier & Valenciennes, 1829). Parkinson's drawing from a Tahitian fish was used as part basis by Cuvier for the description of this species, although because of a copyist's error the trivial name was changed from Solander's areata to *arcata*. (Catalogue number 166.)

167.(**2**:77) *Plectorhynchus picus* (Cuvier in Cuvier & Valenciennes, 1830) Pomadasyidae

DRAWING: unfinished water-colour; *r*. [pencil] 'Tairhepha/[ink] S. Parkinson'; *v*. [pencil] 'The parts mark'd thus x are white inclining to gray especially on the finns/ & on the face reddish. those mark'd w^{t} 2 are black the scales edged w^{t} dirty white./ The iris gold colour pupil black./N^{o} 45 Percoides pica/[ink] Otahite'. 268 × 372.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.19 (137) as Percoides Pica, one specimen serial number A.39; (f.287) index. Dryander – Catalogue – not traced, the name Percoides is not entered, and there is no entry Perca pica.

NOTES: Solander's name pica was employed by Cuvier (1830) in the form *Diagramma pica* and he referred to this drawing in his discussion of the species. He also had a specimen in his collection.

Another drawing of this species is listed at number 162 in this catalogue.

168.(**2**:78) *Cynoscion* sp. Sciaenidae

DRAWING: finished water-colour; *r*. [ink] 'S. Parkinson'; *v*. [pencil] 'N^{o} 10. Perca/[ink] Brasil'. 297 × 478.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue f.157 probably as *Perca* —— Brasil, S. Parkinson.

NOTES: as there is no trivial name on this drawing it is impossible to be certain to which entry in Dryander's Catalogue this drawing relates. The only Parkinson drawing from Brazil is said to be a 'sketch with colours' but this appears to be a finished drawing. On the other hand the detail of this drawing is dissimilar to Parkinson's usual style and it is possible that it is a Buchan drawing misattributed by Dryander in his annotation to the drawing. There are three Buchan drawings listed as *Perca* —— from Brazil in Dryander's Catalogue.

Like several other Brazilian fishes there is no entry for this in Solander's manuscript.

169.(**2**:79*a*) *Anthias anthias* (Linnaeus, 1758) Serranidae

DRAWING: finished water-colour; *r.* [ink] 'Perca Imperator./Sydney Parkinson. pinx^{t} 1768./S. Parkinson'; *v.* [ink] 'Madeira'. 263 × 329.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2 f.67–70*v*, as Perca Imperator, habitat in Oceano Atlantico Maderae, total length $7\frac{1}{2}$ inches. (D. & W. 42) C.S.D. f.257 (276), same data.

NOTES: Solander's name Perca Imperator (derived from his note of the Madeiran vernacular 'Emperador') seems not to have been employed by later naturalists.

There is a specimen in the collection of the British Museum (Natural History) from Madeira, in the Old Collection as *Perca imperator* (see Günther, 1859) which is undoubtedly the *Endeavour* specimen.

170.(**2**:79*b*) *Anthias anthias* (Linnaeus, 1758) Serranidae

DRAWING: unfinished water-colour, pencil details of head and pelvic fin; *r.* [ink] 'S. Parkinson Perca imperator T: 17 Madeira'; *v.* [pencil] 'Mem. that the P.A. is somewhat brownish & the Pinna V. is upon the orange lay the spots upon the head/ of a very delicate scarlet N.B. M^{r} B. thinks it too pale'. 213 × 292.

MANUSCRIPT: see above number 169.

NOTES: this must have been a preliminary sketch of this fish which was redrawn to take account of Banks's comments recorded in the annotation. See also number 169.

171.(**2**:80) *Mycteroperca rubra* (Bloch, 1793) Serranidae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Buchan'; *v.* [pencil] 'N^{o} 11. Perca/[ink] Brasil'. 269 × 368.

MANUSCRIPT: Solander – not traced; there are no entries under the genus *Perca* in the Slip Catalogue (D. & W. 42). Dryander – Catalogue f.157 presumed to be one of the three Brasilian drawings of *Perca* —— by A. Buchan.

NOTES: there are very few entries for Brazilian fishes in Solander's manuscripts; this is another example where no description was made.

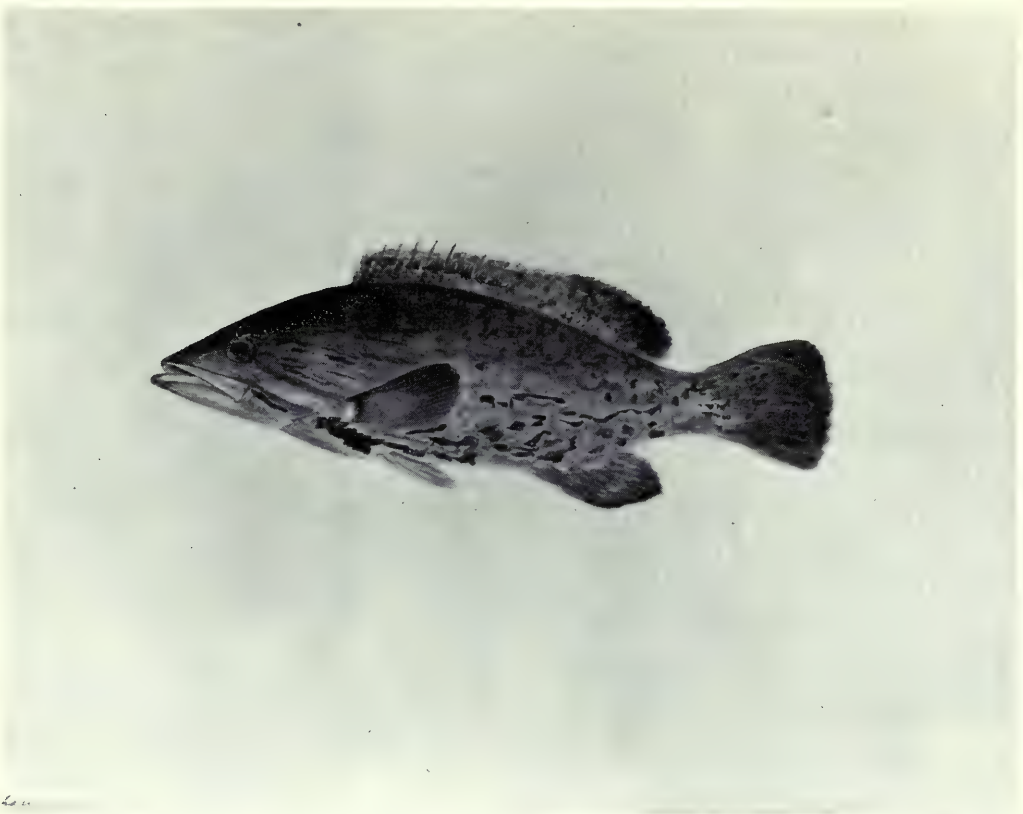

Fig. 12 *Mycteroperca rubra* (Bloch, 1793). Drawing by Buchan of a Brazilian fish. (Catalogue number 171.)

172.(**2**:81) *Cephalopholis urodelus* (Bloch & Schneider, 1801) Serranidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson [pencil] Matapoo'; *v.* [pencil] 'The whole body is dark red especially toward the tail & back./spotted w^{t} bright scarlet./N^{o} 37. Perca escarlatina/[ink] Otahite'. 269 × 373.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.23 (141) as Perca escarlatina, one specimen serial number A.56; f.34 (152) one specimen, number A.68; f.35 (153) two specimens A.72, and one A.190; f.(287) lists four of these in the index and list of specimens. Dryander – Catalogue f.157–8, not identified amongst the seven *Perca* —— drawings by Parkinson from the Society Islands.

NOTES: the name Perca escarlatina appears not to have been adopted by any later naturalist.

173.(**2**:82) *Mycteroperca* sp. Serranidae

DRAWING: finished water-colour; *r.* [ink] 'Perca. asellina./Sydney Parkinson pinx^{t} 1769'; *v.* [pencil] '16 Perca/Gadoides/[pencil – four lines of unreadable notes]/[ink] Brasil'. 294 × 478.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.57–58v, as Perca asellina, Habitat at Rio Janeiro; (D. & W. 41) f.251 (268), same data. Dryander – Catalogue f.157 as Perca asellina mss, finished in colours —— Brasil, S. Parkinson.

NOTES: Solander's name Perca asellina seems not to have been used by later workers.

The drawing appears to be of a large fish, but it is not possible to confirm this as for once no length was given for the specimen in Solander's description. The inferred large size of the specimen has led to an apparently inaccurate drawing which is difficult to identify.

174.(**2**:83) *Serranus atricauda* Günther, 1874 Serranidae

DRAWING: pencil & wash; *r.* [ink] 'Perca – decorata/Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Madeira'. 270 × 373.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.63–64v, as Perca decorata, 'Habitat in Oceano Atlantico prope Maderam', length of the specimen 10 inches; (D. & W. 41) f.255 (272), same data. Dryander – Catalogue f.157 as Perca decorata, finished without colour, —— Madeira, S. Parkinson.

NOTES: the *Endeavour* specimen is still preserved in the British Museum (Natural History). It was listed by Günther (1859) as *Serranus cabrilla*, specimen i. 'Adult: not good state. Madeira. Old Collection as *Perca decorata*'. Boulenger (1895) listed it with several other specimens which Günther had originally called *S. cabrilla* as one of the 'Types' of *Serranus atricauda*, but it is doubtful whether it should be regarded as a type because Günther (1874) had merely described the species from a specimen from Morocco and commented that it was 'identical with others in the British Museum from the Azores, Madeira and the Canary Islands'. The *Endeavour* fish was one of the Madeiran specimens.

Other than being listed in synonymy by Günther (1874) the Solander name Perca decorata has not been employed by later naturalists.

175.(**2**:84) *Epinephelus itajara* (Lichtenstein, 1822) Serranidae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Buchan/[pencil] Light red' [beside mouth]/[numerals beside fins indicating numbers of rays]; *v.* [pencil] 'N^{o} 9. Perca nebulosa/[ink] Brasil'. 268 × 370.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.59–61v as Perca nebulosa, habitat in Oceano prope Fluvium Januarii Brasiliae [Rio de Janeiro]; (D. & W. 42) C.S.D. f.253 (270), same data. Dryander – Catalogue f.157, not listed by name but presumed to be one of three *Perca* —— drawings by Buchan from Brazil.

NOTES: the Solander name Perca nebulosa seems never to have been used by later naturalists.

176.(**2**:85) *Micropogon ? undulatus* (Linnaeus, 1766) Sciaenidae

DRAWING: finished water-colour by A. Buchan; *r.* [pencil] 'Perca undulata L. ?/

[ink] A. Buchan'; *v.* [pencil] 'N° 12. Perca/[ink] Brasil'. 268 × 369.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue f.157 presumed to be one of three *Perca* —— drawings by Buchan from Brazil.

NOTES: as with several other fishes caught and drawn at Brazil there seems to be no description by Solander of this specimen which served as a basis for Buchan's drawing.

177.(**2**:86) *Naucrates ductor* (Linnaeus, 1758) Carangidae

DRAWING: finished water-colour; *r.* [ink] 'Gasterosteus – Ductor/Sydney Parkinson pinx[t] 1768'; *v.* [none]. 224 × 292.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.88 and (D. & W. 42) C.S.D. f.88, both as *Gasterosteus Ductor* with reference to Linnaeus and meristic data but no habitat given or description. Dryander – Catalogue f.161 as *G. Ductor* L., finished with colour, Ocean, S. Parkinson.

NOTES: the pilot fish was well known to sailors and was described by Linnaeus from the accounts and specimens of other travellers. Presumably Solander did not consider it necessary to describe this species in detail.

178.(**2**:87) *Acanthocybium solandri* (Cuvier in Cuvier & Valenciennes, 1832) Scombridae

DRAWING: finished water-colour; *r.* [ink] 'Scomber lanceolatus/Sydney Parkinson pinx[t] 1769/[pencil] Tatea/[ink] Mem. one Pinulae spuriae is wanting above & one below'; *v.* [pencil] 'off Thrum Cap. Island'. 297 × 462.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.107–110v as Scomber lanceolatus, 'habitat in Oceano australi seu Mari Pacifico, prope Insulas ("Thrum Cap"), Apr. 4, 1769 . . .', length 4 feet; (D. & W. 42) C.S.D. f.267 (284), same data. Dryander – Catalogue f.163 as finished in colour, Scomber lanceolatus Mss —— Ocean, S. Parkinson.

NOTES: Solander's manuscript was the sole source of Cuvier's information for his description and name *Cybium Solandri*. He made no reference to this drawing which is undoubtedly of the specimen Solander described. No locality was given by Cuvier (1832), and Günther (1860) likewise questioned the geographical origin of the specimen. This uncertainty has continued till the present day because Collette & Nauen (1983) comment that the locality was unknown. Thrum Cap Island lies immediately south of the island of Hau in the Tuamotu archipelago, and this is the type locality for this species.

179.(**2**:88) *Selar crumenophthalmus* (Bloch, 1793) Carangidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[ink] Etoore/Owhey'; *v.* [pencil] 'N° 41. Scomber albula/[ink] Otahite'. 265 × 372.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.10 (124) as Scomber albula, a total of four specimens preserved, one numbered A.26 'magna', three of medium

size numbered A.73, from George Land (= Tahiti). Dryander – Catalogue f.161–2, not entered as Scomber albula, presumably one of the three *Scomber* —— drawings from the Society Islands, by S. Parkinson,

NOTES: Solander's name Scomber albula seems never to have been employed by later naturalists.

180.(**2**:89) *Caranx lutescens* (Richardson, 1843) Carangidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'the belly an opaline colour – /12. Scomber micans/[ink] Opoorage'. 292 × 473.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.33 (35) as Scomber micans, habitat off Motuaro. Dryander – Catalogue f.163, one of two drawings of *Scomber* —— sketch with colours, New Zealand, S. Parkinson.

NOTES: Solander's name Scomber micans was published by Richardson (1843*c*) and his description was quoted extensively in a discussion of carangid fishes known from New Zealand. Parkinson's drawing was also referred to. Both the description and figure were referred to elsewhere by Richardson (1843*b*) in the synonymy of *Caranx georgianus*, as they were by Richardson (1848) under the same name but with discussion.

Scomber lutescens was based by Richardson (1843) on Solander's manuscript description of a specimen caught in New Zealand waters on 30 March 1770 in Queen Charlotte Sound, but not illustrated (see D. & W. 40a, P.A. f.51 (53)).

181.(**2**:90) *Pomatomus saltatrix* (Linnaeus, 1766) Pomatomidae

DRAWING: finished water-colour; *r.* [ink] 'Scomber – salmoneus./Sydney Parkinson – pinx^{t} 1769./[pencil] gasterosteus saltatrix Linn'; *v.* [pencil – two lines of indecipherable notes/and name]/[ink] 'Brasil'. 298 × 465.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.125–125v as Scomber saltatrix [specific epithet substituted for salmoneus], habitat in Oceano Brasiliensis; (D. & W. 42) C.S.D. f.277 (145), same data. Dryander – Catalogue f.161 as Scomber salmoneus mss, finished in colour —— Brasil, S. Parkinson.

NOTES: *Pomatomus saltatrix* was described by Linnaeus in 1766 (as *Gasterosteus*) on the basis of Catesby's earlier description and a specimen in the Garden collection (Wheeler, 1985). Possibly Solander failed to recognize the Linnaean species because of its obvious affinity to the genus *Scomber*, not *Gasterosteus*, and therefore proposed the specific epithet salmoneus. However, he later recognized it as identical with Linnaeus's species and amended his manuscript, and the name on the drawing was altered also.

182.(**2**:91) *Rexea solandri* (Cuvier in Cuvier & Valenciennes, 1832) Gempylidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[in pencil on mount] Gempylus solandri *Cuv.* & *Val.*'; *v.* [pencil] '15 Scomber macrophthalmus/[ink] Aehie no Mauwe'. 296 × 469.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.44 (46) as Scomber macrophthalmus, habitat Oceano australium, 9 December 1769; f.72 listed in index. Dryander – Catalogue f.163, presumed to be one of the two *Scomber* —— sketches with colours, drawn in New Zealand by S. Parkinson.

NOTES: Solander's name Scomber macrophthalmus was quoted by Cuvier (1832) when he described *Gempylus solandri*. This species was based solely on Solander's manuscript account and Cuvier made no reference to the Parkinson drawing. Possibly it had not been copied for him. He also claimed that the fish came from 'la mer de la Nouvelle-Holland', presumably confused by the title of Solander's manuscript 'Pisces Australiae'.

On 9 December 1769 the *Endeavour* had just left the Bay of Islands en route for the South Island of New Zealand.

Reproduced by Whitehead (1968) as his Plate 21 and alleged to be the basis for the species *Gempylus solandri* although as noted above Cuvier made no reference to the drawing.

183.(**2**:92) *Gempylus serpens* Cuvier, 1829 Gempylidae

DRAWING: finished water-colour; *r.* [ink] 'Scomber-serpens/Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Sept^{r}. 23. 1768/of Canary Islands'. 299 × 469.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.111–114*v* as Scomber serpens, 'habitat in Oceano Atlantico prope Insulas canariensis (Sept^{r}. 22. 1768 captus.)', length 37 inches; (D. & W. 42) C.S.D. f.269 (137), same data. Dryander – Catalogue f.161 as Scomber serpens Mss —— Ocean, S. Parkinson.

NOTES: Cuvier (1832) referred to Solander's description of Scomber serpens and quoted from it in part, but he also had a dry specimen from the Caribbean ('Antilles') to refer to. The first record and figure of this rare oceanic fish was made by Hans Sloane on his voyage to Jamaica (Sloane, 1707) and this was also referred to by Cuvier.

184.(**2**:93) *Caranx melampygus* Cuvier in Cuvier & Valenciennes, 1833 Carangidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Eürùā/Eppouea/[ink] S. Parkinson'; *v.* [pencil] 'all spotted but the belly, fins & tail a dirty grey, about the bottom of the tail a list of dark blue/N^{o} 3. Scomber stellaris/[ink] Otahite'. 295 × 467.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.104 (224), possibly as Scomber stellatus, length 18 inches (but see number 186 this catalogue). Dryander – Catalogue ff.161–163, presumed to be one of the four *Scomber* —— drawings made by Parkinson in the Society Islands but not identified to species in the catalogue of drawings.

NOTES: Solander's name, Scomber stellaris (as given on the drawing) or S. stellatus (as in his manuscript) does not seem to have been adopted by later workers. Cuvier (1833) in proposing the name *Caranx melampygus* made no reference to either Parkinson's drawing or Solander's description.

185.(**2**:94) *Carangoides crysos* (Mitchill, 1815) Carangidae

DRAWING: finished water-colour; *r.* [ink] 'Scomber falcatus./Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Nov^{r}. 8th. 1768/Coast of Brasil'. 299 × 460.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.115–118v as Scomber falcatus, 'habitat in Oceano Brasiliam alluente', length 16 inches; (D. & W. 42) C.S.D. f.271 (139), same data. Dryander – Catalogue f.161, as Scomber falcatus mss —— Brasil, S. Parkinson.

NOTES: Solander's name Scomber falcatus has not been adopted by later workers.

186.(**2**:95) *Caranx melampygus* Cuvier in Cuvier & Valenciennes, 1833 Carangidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson [pencil] Owrooå'; *v.* 'Mem. the back & part of the sides are spotted w^{t} blue, the blue should be Ultramarine/the belly opaline./N^{o} 64 Scomber stellatus/[ink] Otahite'. 267 × 370.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.104 (224) as Scomber stellatus, see number 184 in this catalogue.

NOTES: see above number 184. It is not possible to know whether the two drawings labelled Scomber stellaris and S. stellatus, were both intended to refer to the single description of S. stellatus, or whether S. stellaris was omitted from the manuscript in error.

187.(**2**:96) *Katsuwonus pelamis* (Linnaeus, 1758) Scombridae

DRAWING: unfinished, pencil and ink; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N^{o} 1 Scomber Pelamys'. 291 × 462.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, ff.95–100, as Scomber Pelamis; (D. & W. 42) C.S.D. f.263 (280), same data. Dryander – Catalogue f.161 as sketch without colours, Scomber pelamis L., Ocean, S. Parkinson.

NOTES: this well-known tuna was described in great detail by Solander who recognized it as the Linnaean species. The specimen on dissection contained two internal parasites which Solander described in manuscript as Fasciolis Pelamini and Sipunculus Piscium.

188.(**2**:97) *Oligoplites saurus* (Bloch & Schneider, 1801) Carangidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Scomber saurus mss.'; *v.* [pencil] 'Mem. the Belly is like Silver the rest of the fins are grey./ N^{o} 8 Scomber/[ink] Brasil'. 269 × 373.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.120 as Scomber saurus. Dryander – Catalogue f.161 as sketch with colours, Scomber saurus Brouss. —— Brasil, S. Parkinson.

NOTES: the Solander manuscript entry in the Slip Catalogue (see above) was written after the *Endeavour* voyage and evidently described a specimen sent to Banks by Roger Shakespear around 1779 (Dawson, 1958), but the specific epithet derives from Patrick Browne's (1756) *The civil and natural history of Jamaica* in which he refers to this species as Saurus number 1. This explains the coincidence of Bloch (in Bloch & Schneider, 1801) adopting the same specific epithet. To the Solander slip a pencil addition has been made, probably by Broussonet, referring to the Parkinson drawing as 'Scomber N°. 8 Brasil'. This presumably was the occasion when the drawing was annotated as noted above, and this was the reason Dryander attributed the name to Broussonet.

189.(**2**:98) *Scomberoides lysan* (Forsskål, 1775) Carangidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Scomb. Glaucus L/Eràì/[ink] S. Parkinson'; *v.* [pencil] 'the belly silvery/N°. 14. Scomber laevis/[ink] Otahite'. 265 × 374.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.16 (134) as Scomber laevis, length 16½ inches. Dryander – Catalogue f.161–3, not identified by name, presumed to be one of three Parkinson drawings from the Society Islands listed as *Scomber*.

NOTES: Solander's name Scomber laevis does not appear to have been used by later naturalists. The annotation Scomb. Glaucus L. on the recto of the drawing was probably written by Broussonet under the misapprehension that this fish was identical with Linnaeus's species of that name now regarded as a junior synonym of *Trachinotus ovatus* (Linnaeus, 1758), see Wheeler (1963) for discussion.

190.(**2**:99) *Seriola zonata* (Mitchill, 1815) Carangidae

DRAWING: finished water-colour; *r.* [ink] 'Scomber – amia./Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Nov^{r}. 8. 1768/Coast of Brasil'. 290 × 462.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.121–124*v* as Scomber amia L., Habitat in Oceano Brasiliano, total length 39 inches; (D. & W. 42) C.S.D. f.275 (143), same data. Dryander – Catalogue f.161 as Scomber amia L. —— Brasil, S. Parkinson, finished in colours.

NOTES: Solander identified this fish with Linnaeus's *Scomber amia*, now known as *Lichia amia* (Linnaeus, 1758).

191.(**2**:100) *Thunnus albacares* (Bonnaterre, 1788) Scombridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Eahè/aahei/[ink] S. Parkinson'; *v.* [pencil] 'The belly lead colour with an opal cast streakt & spotted w^{t} silver the under part of the head silvery the P.P. lead colour/the P.D. & P.A. bright yellow the Iris silver the pupil black/76. Scomber Thynnus/[ink] August. 14 1769/off the Island of Oheteroa'. 292 × 471.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.135 (255) as Scomber Thynnus [deleted by red and black vertical lines], habitat in oceano non procus ab

insula Ohitirhoa (August 13, 1769). Dryander – Catalogue f.161, as sketch with colours, *Scomber Thynnus* L. —— Ocean, S. Parkinson.

NOTES: Solander identified this tuna with the Linnaean species *Scomber thynnus*, which was the only large species known at the time (*Katsuwonus pelamis* (Linnaeus, 1758) being the comparatively small skipjack tuna). This specimen was captured soon after leaving the Society Islands on 9 August 1769.

192.(**2**:101) *Sarda sarda* (Bloch, 1793) Scombridae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Buchan [pencil] 22.16'; *v.* [ink] 'Brasil'. 265 × 370.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Pisces 2, f.100 as Scomber Pelamis 'varietas capta in Ostrio Fluvii Januarii (Rio de Janeiro) . . .'; (D. & W. 42) C.S.D. f.263 (280), same data (see notes). Dryander – Catalogue f.161 as *Scomber*, finished in colour —— Brasil, Buchan.

NOTES: the identification of this specimen in the Dryander Catalogue is certain as there is only one Buchan drawing of *Scomber*. Solander's notes imply that he examined two specimens which he identified as *Scomber pelamis* Linnaeus, 1758. In the *Slip Catalogue* there is a long and detailed description of a tunny occupying ff.95–99*v* with, on f.100, a note (as quoted above) referring to a variety of the species. This appears to have been written on a separate occasion to the main entry and probably refers to the fish Buchan drew, Solander apparently having considered it to be a variety of *Scomber pelamis* – it was not recognized as distinct and formally named for several years after the *Endeavour* voyage.

193.(**2**:102*a*) *Upeneus vittatus* (Forsskål, 1775) Mullidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Eraòu ă/[ink] S. Parkinson'; *v.* [pencil] 'there is some of this 3 times as large/Ehuwīa/N° 19 Mugil [changed to] Mullus vitatus/[ink] Otahite'. 239 × 296.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.3 (115) as Mullus vittatus Fig. Pict. specimen numbered A9 from George Land, and f.38 (156) two specimens numbered A75 and A159 in Caggs number 3 and 6 respectively. Dryander – Catalogue f.173, as sketch with colours, *Mugil* —— Society Island, S. Parkinson.

NOTES: Solander's index to P.A.O.P. (f.285) shows that he had preserved a total of six specimens of his Mullus vittatus, but the main text shows that the first described (at f.3 (115)) was the one drawn. There are no specimens listed by Günther (1859) which could be *Endeavour* fishes, but there is a specimen in the Muséum National d'Histoire Naturelle, Paris, from Broussonet's collection (A 3461; S.L. 105, T.L. 137 mm) which is probably an *Endeavour* specimen (Bauchot, 1969). George Land was the name briefly in use on the expedition for Tahiti, although later usage was Otaheite.

194.(**2**:102*b*) *Prionotus* sp. Triglidae

DRAWING: pencil sketch; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'the body of a Greenish fusca spotted w^{t} redish brown the head has more of the yellow or orange init the Belly/a shell colour the P.P. nutmeg colour clouded near the upper side w^{t} black the under side edg'd w^{t} blue the P.V./has a tinge of red the P.D. grey spotted with reddish brown – the tail at the base the same colour as the belly/but the most part red spotted w^{t} dark brown – the Iris of the eye yellow pupil black. – N^{o} 17. Trigla/[ink] Brasil'. 235 × 294.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue f.165 as *Trigla* ——, sketch without colours, Brasil, S. Parkinson.

NOTES: this appears to be another of the Brazilian fishes which were not described although they were drawn.

195.(**2**:103) *Dactylopterus volitans* (Linnaeus, 1758) Dactylopteridae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The blue on the P.P. should be ultramarine/N^{o} 6. Trigla volitans/[ink] Brasil'. 295 × 480.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue f.165 as sketch with colours, *Trigla volitans* L. —— Brasil, S. Parkinson.

NOTES: possibly because this fish was identified with the Linnaean species *Trigla volitans* it was not described. A number of other Brazilian fishes, although drawn, are not to be found in any manuscript, and for some reason were not described or the Brazilian animal manuscript has been lost.

196.(**2**:104) *Chelidonichthys kumu* (Lesson & Garnot, 1826) Triglidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson' [pencil, notes on coloration written on the drawing]; *v.* [pencil] '5. Trigla papilionacea/[ink] Opoorage'. 297 × 465.

MANUSCRIPT: Solander – (D. & W. 40a) P.A. f.20 (22) as Trigla papilionacea, habitat Tolaga, Opoorage, two unmarked specimens preserved; f.73 index to the specimens lists three preserved specimens. Dryander – Catalogue f.165 as sketch with colours, *Trigla* —— New Zealand, S. Parkinson.

NOTES: Solander's name *Trigla papilionacea* was published by Cuvier (1829), although in the synonymy of *T. kumu*. Cuvier referred to this Parkinson drawing in Banks's library. This drawing was reproduced by Whitehead (1968) as Plate 35.

Both Parkinson's drawing and Solander's manuscript were referred to by Richardson (1843*a* & *b*) under the name *Trigla papilionacea*.

197.(**2**:105) *Bagre marinus* (Mitchill, 1815) Ariidae

DRAWING: finished water-colour; *r.* [ink] 'Silurus – Bagra-/Sydney Parkinson pinx^{t} 1769'; *v.* [pencil] 'The fins Gray/7 Silurus Bagre/[ink] Brasil'. 294 × 467.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue f.167 as finished in colours, *Silurus bagre* L. —— Brasil, S. Parkinson.

NOTES: this appears to be another example of a Brazilian fish which, although drawn by one of the artists, was not described by Solander.

198.(**2**:106) *Sphyraena helleri* Jenkins, 1901 Sphyraenidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'N° 2 Esox sphyraenoides/[ink] Otahite'. 299 × 479.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.60 (180) as Esox Sphyrenoides, f.290 index, specimen not preserved. Dryander – Catalogue f.171, one of two drawings of *Esox* ——, sketch with colours, Society Islands, S. Parkinson.

NOTES: Solander's name Esox sphyraenoides does not seem to have been taken up by later naturalists, although Cuvier (1829) cites a drawing in Banks's library made at Tahiti and labelled Esox sphyraenoides which he attributed to G. A. Forster. However, there are no drawings of *Sphyraena* in the Forster collection, nor is there a drawing labelled Esox sphyraenoides (Wheeler, 1981), so it must be assumed that Cuvier mistook this Parkinson drawing for one by Forster. This would be understandable as he worked only from copies of the drawings. However, the confusion was unfortunate in that he named the species *Sphyraena forsteri* under the false impression that it was a Forster specimen.

199.(**2**:107) *Platybelone argala* (Le Sueur, 1821) Belonidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Ihre Eawaou/Ichea Eawaou/Es. belone L./[ink] S. Parkinson'; *v.* [pencil] 'N° 65 Esox rostratus/[ink] Otahite'. 268 × 374.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.26 (144), as Esox rostratus, three specimens preserved numbered A.60. Dryander – Catalogue f.171, one of two drawings of *Esox* —— sketch with colours, Society Islands, S. Parkinson.

NOTES: Solander's name Esox rostratus seems not to have been adopted by later authors, although the specific epithet has been independently employed for other species of garfish. The identification of this drawing with the Linnaean *Esox belone*, the only garfish to have been named at the time of the *Endeavour* voyage was probably by Broussonet.

200.(**2**:108) *Parexocoetus brachypterus* (Richardson, 1846) Exocoetidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Etèpa/[ink] S. Parkinson'; *v.* [pencil] 'The roundness of the back to be taken of to where it is mark'd/the blue to be ultramarine/N° 44 Exocoetus brachyopterus/[ink] Otahite'. 268 × 371.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.13 (129) as Exocoetus brachyopterus, George Land ten specimens numbered A.35. Dryander – Catalogue f.173, sketch with colours *Exocoetus* —— Society Islands, S. Parkinson.

NOTES: the Solander name *Exocoetus brachypterus* was published by Richardson (1846) within his discussion of *Exocoetus monocirrhus*. He referred to both the Parkinson drawing and the Solander manuscript. Both manuscript and drawing were also referred to by Günther (1866), who also gave a measurement of the drawing. This drawing therefore has type status.

The manuscript and the drawing were also cited by Valenciennes (1847) in his description of *Exocoetus Solandri* and form the bases for the foundation of that species name. However, Valenciennes wrongly attributed the drawing to Forster (an error he made elsewhere); the Forster drawings include only one flyingfish and that drawn off the European coast (Wheeler, 1981).

This drawing was reproduced by Whitehead (1968) as Plate 9.

201.(**2**:109) *Cypselurus* (*Poecilocypselurus*) *poecilopterus* (Valenciennes in Cuvier & Valenciennes, 1847) Exocoetidae

DRAWING: unfinished water-colour; *r.* [pencil] 'E. volitans/Mararaa/[ink] S. Parkinson'; *v.* [pencil] 'lower part of the head & eye & fore part of the belly silver the Pinnae transparent/the spots on the P.P. black./N°. 4 Exocoetus alatus/[ink] Otahite'. 289 × 475.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.33 (151) as Exocoetus alatus, two specimens numbered A.67. Dryander – Catalogue f.173, sketch with colours *Exocoetus volitans* —— Ocean, S. Parkinson.

NOTES: Solander's description, but not the drawing for certain, was cited by Valenciennes (1847) although he had a specimen collected on the *Astrolabe* expedition for his main description of *Exocoetus poecilopterus*.

202.(**2**:110) *Exocoetus volitans* Linnaeus, 1758 Exocoetidae

DRAWING: five pencil studies of flying fishes and fins; *r.* [pencil] 'E. evolans L/[ink] S. Parkinson'; *v.* [pencil] 'Mem the back is of a blackish blue mix^{t} with brown which turns paler/toward the side & goes gradually into a silver colour the fins all transparent/the pupil of the eye very dark blue the iride dark brown the top of the/back part of the head is very brown, the tail gray underneath upon where therein/lines is mark'd with fine strip of blue/N° 2. Exocoetus volitans'. 295 × 475.

MANUSCRIPT: Solander – (D. & W. 45) Pisces 2, f.213–215v, as *Exocoetus volitans* L., Habitat in Oceano Atlantico; (D. & W. 42) C.S.D., same data. Dryander – Catalogue f.173, sketch without colours, *Exocoetus volitans* L. —— Ocean, S. Parkinson.

NOTES: this drawing was referred to by Richardson (1846) as *Exocoetus volans* Solander, and he also cited the Solander manuscripts. Richardson's only other material was a Chinese fish collected by Sir Edward Belcher, and as he gave 'Seas of China and Polynesia' as the habitat of the species it seems that he wrongly assumed that this *Endeavour* specimen came from Polynesia. It seems from Solander's notes, however, that it was an Atlantic specimen which was described and drawn.

203.(**2**:111) *Eleutheronema tetradactylum* (Shaw, 1804) Polynemidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'Polynemus quadrenarius/[ink] Endeavours river'. 268 × 372.

MANUSCRIPT: Solander – (D. & W. 40b) P.N.H. f.15 (97) as Polynemus quadernarius, habitat near Endeavour River Careening place 30 July 1770. Dryander – Catalogue f.173, no Parkinson drawing entered, two of the three Forster drawings listed are probably misattributed.

NOTES: Solander's name Polynemus quadernarius seems not to have been adopted by later writers.

204.(**2**:112) *Coris gaimardi* (Quoy & Gaimard, 1824) Labridae

DRAWING: unfinished water-colour; *r.* [pencilled coloration notes on figure], [ink] 'S. Parkinson'; *v.* [pencil] 'the strips on the head verditer & Gamboge the body is a purple black spotted especially toward the tail with/Ultramarine & towards the head w^t^ small spots of Green – the border, stripes & spots on the tail blue/the body turns more purple towards the head/[pencil] 71/[ink] Ulhietea/[pencil, on mount of drawing] Julis gaimardi Frey Voy Uranie t54 f1'. 271 × 374.

MANUSCRIPT: Solander – not traced, was not named and probably never described. Dryander – Catalogue not traced.

NOTES: there is no evidence that this fish was named, and therefore it is impossible to relate it to either Dryander's catalogue or Solander's manuscript. The specimen was collected at Raiatea (16°50′ S., 151°24′ W.).

205.(**2**:113) *Saurida gracilis* (Quoy & Gaimard, 1824) Synodontidae

DRAWING: unfinished water-colour, pencil detail of jaw dentition; *r.* [pencil] 'Arāi [ink] S. Parkinson'; *v.* [pencil] 'The edges of the scales border'd w^t^ brownish purple very dark where the spot is & on the back towards the tail./N^o^ 22 Dentex nebulosus/[ink] Otahite'. 267 × 369.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.6 (118) as Dentex nebulosus, serial number A.14 but not so labelled in Cagg 3; (f.285) index shows that two specimens were preserved. Dryander – Catalogue f.169 as Dentex ——, sketch with colours, Society Islands, S. Parkinson.

NOTES: the Solander name Dentex nebulosus was published by Valenciennes (1849) as *Saurida nebulosa*. Although Valenciennes had specimens from the Ile de France (Mauritius) he also referred to the Parkinson drawing which he had seen. Solander's genus Dentex was an independent proposal to *Dentex* of Cuvier (1815) in the family Sparidae.

206.(**2**:114) *Synodus variegatus* (Quoy & Gaimard, 1824) Synodontidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Arai/[ink] S. Parkinson'; *v.* [pencil] 'N^o^ 47. Dentex marmoreus/[ink] Otahite'. 267 × 371.

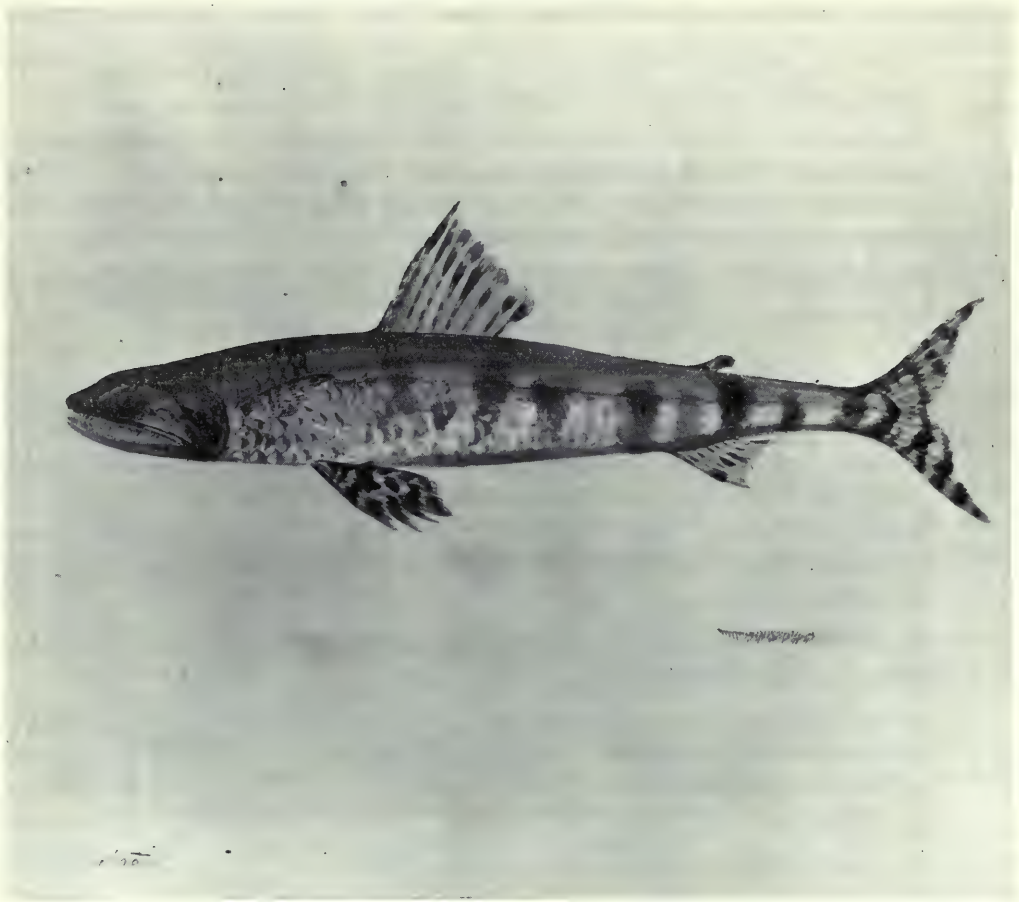

Fig. 13 *Saurida gracilis* (Quoy & Gaimard, 1824). Drawing by Parkinson of one of two specimens caught in Tahiti. (Catalogue number 205.)

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.83 (203) as Dentex marmoreus, one specimen not numbered, another numbered A.135; (f.290) index lists two specimens. Dryander – Catalogue f.169 as Dentex ——, sketch with colours, Society Islands, S. Parkinson.

NOTES: Valenciennes (1849) referred to a copy of this drawing and also had a copy of the manuscript description of Dentex marmoreus. It is interesting that at that date he correctly cited the history of the drawing as in the library of Banks, 'aujourd'hui déposée au British Museum', but that the copies had been made by permission of Robert Brown.

207.(**2**:115*a*) *Gomphosus varius* Lacepède, 1802 Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Paootiroa/Páoùdúróá/[ink] S. Parkinson'; *v.* [pencil] 'N° 7 Nasutus virescens/[ink] Otahite'. 239 × 340.

MANUSCRIPT: Solander – (D. & W. 40c) f.49 (169) as Nasutus virescens, one specimen, numbered A.95 in Cagg 4; (f.289), same data. Dryander – Catalogue f.153 as Nasutus ——, sketch with colours, Fr. Isl. (= Friendly Islands), S. Parkinson.

NOTES: Solander's appropriate genus name, Nasutus, for the bird-wrasses was never formally published and they were unnamed until Lacepède proposed *Gomphosus* in 1802. Two specimens still exist in the British Museum (Natural History) collections, S.L. 105 and 145 mm, and were listed by Günther (1862) under *Gomphosus varius* with a note of an old label reading Labrus nasutus on it (the writing on this label is still readable). There seems to be no doubt that those specimens are *Endeavour* specimens and represent this fish and the succeeding one.

Dryander's entry of Friendly Islands as the locality for this drawing is erroneous; these islands were not visited by the *Endeavour*.

Valenciennes (1840) in his discussion of *Gomphosus fuscus* refers to this drawing in Banks's library, noting that it was captioned nasutus.

The drawing represents a terminal phase male.

208.(**2**:115*b*) *Gomphosus varius* Lacepède, 1802 Labridae

DRAWING: unfinished water-colour; *r.* [pencil] 'Epàoū outouròā/[ink] S. Parkinson'; *v.* [pencil] 'narrow border of white upon the P.D. & y^{e} P.A. the cheeks silvery/the back especialy towards the tail darker & the colour on the edges./The scales their considerably broader. the strip on the tail a dilute red or white w^{t} red cast/N° 23 Nasutus purpureus/nasutus/[ink] Otahite'. 203 × 283.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.3 (115) as Nasutus purpurascens, serial number A.11, George Land; f.48 (166) one specimen serial number A.94; (f.285) index confirms that two specimens were preserved. Dryander – Catalogue f.153 as Nasutus ——, sketch with colours, Fr. Isl., S. Parkinson.

NOTES: see notes in number 207 above.

This drawing represents a female fish turning into a male.

209.(**2**:116) *Lutjanus fulvus* (Bloch & Schneider, 1801) Lutjanidae

DRAWING: unfinished water-colour; *r.* [ink] 'S. Parkinson/[pencil] Ettoou'; *v.* [pencil] '70 [ink] Ulhietea'. 270 × 371.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue not traced.

NOTES: as this fish was not named it is impossible to trace it in either the manuscript or the catalogue of drawings.

210.(**2**:117) *Centropyge bispinosus* (Günther, 1860) Pomacanthidae

DRAWING: unfinished water-colour; *r.* [pencil] 'Hoomurea/Athòdi tui tui/[ink] S. Parkinson'; *v.* [ink] 'Otahite'. 235 × 298.

MANUSCRIPT: Solander – not traced. Dryander – Catalogue not traced.

NOTES: as the fish in this drawing was not identified it is impossible to trace it in either the manuscript or the catalogue of drawings. It is perhaps worth noting here that the arrangement of the fish drawings followed Linnaeus's twelfth edition of the *Systema Naturae*, but that the six last drawings (the two unrecognized genera, Dentex and Nasutus, and the two unidentified fishes) could not be accommodated in the system and were merely grouped at the end of the volume.

211.(**3**:1*a*) *Leucophaea maderae* (Fabricius, 1781) Oxyhaloidae

DRAWING: water-colour, dorsal and ventral views of insect, and egg case by A. Buchan; *r.* [pencil] 'Blatta maderae'; *v.* [none]. 133 × 232.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Hemiptera f. 2 as Blatta domestica 'in Madeira culinis'. Dryander – Catalogue f. 191 as finished in colours, Blatta Madera Fabr. —— Madeira, A. Buchan.

NOTES: Fabricius (1781) based his name on a specimen examined in 'Mus. Dom Banks' which, because of the locality and of the identification given to this drawing by Dryander must have been the specimen drawn by Buchan (or one collected at the same time). The drawing therefore has some standing as type material.

It is of interest to note that the Dryander Catalogue lists two drawings by Buchan of *Blatta germanica* Linnaeus, 1767 with the locality of 'in nave'. Neither of these is now in the collection of *Endeavour* drawings.

212.(**3**:1*b*) Isoptera (family, genus and species indet) Order Isoptera

DRAWING: water-colour, dorsal view, by A. Buchan; *r.* [pencil] 'Termes fatale/ Winged white ant/Termes Fatale'; *v.* [ink] 'Rio Janeiro'. 233 × 257.

MANUSCRIPT: Solander – no description found. Dryander – Catalogue f. 203 as finished in colour Termes fatalis L. —— Brasil, A. Buchan.

NOTES: due to the difficulty in identifying termite specimens it is not possible to give this drawing any identification. *Termes fatale* was a name given by Linnaeus (1758), and was the only species in the genus recognized by Fabricius (1775). Fabricius quoted the Banks Collection in his description but in his opening paragraph referred to the insect as 'Habitat in Indiae . . .', clearly not referring to this drawing. Nevertheless the pencil annotations are believed to be in Fabricius's hand.

213.(**3**.2*a*) *Sceliphron coementarium* (Drury, 1770) Sphecidae

DRAWING: water-colour of a single mud-dauber wasp, lateral view by A. Buchan; *r.* [no annotations]; *v.* [ink] 'Madera'. 182 × 265.

MANUSCRIPT: Solander – no description found. Dryander – Catalogue f. 205 as finished in colour, Sphex —— Madeira, A. Buchan.

NOTES: Drury's (1770) account of *Sphex coementarium* was based on specimens from 'Antigua, St. Christopher's, and Jamaica'. At the time of this drawing this

Fig. 14 *Laminalloptes phaetontis* (Fabricius, 1775). Parkinson's drawing of a feather mite taken from a red-tailed tropic bird shot near Tahiti in March 1769. The drawing was used by Fabricius for his description. (Catalogue number 215.)

mud-dauber wasp was unknown to science; the species was not recorded from Madeira until 1825 (M. Day, personal communication 1979).

214.(**3**:2*b*) *Sceliphron coementarium* (Drury, 1770) Sphecidae

DRAWING: water-colour, two dorsal, one lateral and one oblique views by A. Buchan; *r.* [no annotations]; *v.* [ink] 'Madera'. 183 × 264.

MANUSCRIPT: Solander – no description found. Dryander – Catalogue f.205 as finished in colour, Sphex —— Madeira, A. Buchan.

NOTES: see no.213 in this catalogue.

215.(**3**:3) *Laminalloptes phaetontis* (Fabricius, 1775) Proctophyllodidae

DRAWING: pencil; *r.* [pencil] 'Alloptes phaetontis (Fabr) 1775 ♂ = [ink] Acarus

Phaetontis. [pencil] Fabr 1775/[ink] S. Parkinson pinxt. 1769/[pencil] see Fabricius System Ent p 815 1775'; *v.* [ink] 'March 21 1769/Lat 25.21' Long. 139 W.'. 288 × 234.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f. 101 as Acarus phaetontis on Phaetontis in Oceano Australe; (D. & W. 42) C.S.D. f. 291, as above, 'Habitat copiose in Phaetonte erubescente'. Dryander – Catalogue f. 213 as finished in colours, Acarus Phaëtontis Mss —— Ocean, S. Parkinson.

NOTES: Fabricius (1775) appears to have relied entirely on the Banks material for his description, writing 'Habitat in Phaetonte erubescente Oceani australis Fig. pict *Mus Banks.*' It is uncertain whether this should be read to imply that a specimen was available in the Banks collection, or whether it was the drawing (and Solander's manuscript description) which was available in Banks's museum, as well as the specimen, the latter being the more probable. In any case this drawing has type standing.

The source of Fabricius's information, namely the Solander manuscript description and the Parkinson drawing, was unknown to Atyeo & Peterson (1967), who questioned the identity of the feather mite named by Fabricius and were doubtful concerning the identity of the host bird.

Several of the annotations on the recto quoted above are twentieth-century additions, only the words 'Acarus Phaetontis' and Parkinson's signature are contemporary with the drawing. In fact, Solander's *Phaeton erubescens* is referable to *Phaethon rubricauda melanorhynchos* Gmelin, 1789 (and his material provided the basis for Gmelin's name). Atyeo & Peterson (1967), following earlier workers, considered that the host was *Phaeton lepturus fulvus*; this appears to be incorrect.

216.(**3**:4*a*) *Argiope bruennichi* (Scopoli, 1772) Araneidae

DRAWING: finished water-colour, dorsal and ventral views by A. Buchan; *r.* [pencil] 'Argyope bruennichii (Scopoli) 1772/= Aranea fasciata Fabr 1775/ Fabricius Syst Ent p.433 1775'; *v.* [ink] 'Madera'. 146 × 236.

MANUSCRIPT: Solander – none. Dryander – Catalogue f. 215 as finished in colour, Aranea —— Madeira, A. Buchan.

NOTES: this drawing, and possibly a specimen in Banks's collection, were used by Fabricius (1775) as the basis of his *Aranea fasciata*. The drawing therefore has some standing as type material.

All the annotations on the recto are recent.

217.(**3**:4*b*) *Nephilgenys cruentata* (Fabricius, 1775) Araneidae

DRAWING: finished water-colour; *r.* [pencil] 'Nephilengys cruentata Fabr. 1775/ Fabricius Syst. Ent. p 439 1775./[ink] Sydney Parkinson pinx^{t} ad vivum'; *v.* [pencil] 'Betranea/[ink] Rio de Janeiro'. 229 × 267.

MANUSCRIPT: Solander – none. Dryander – Catalogue f. 215 as finished in colour, Aranea —— Madeira, S. Parkinson.

Fig. 15 *Sesarma* sp. Drawn by Buchan at Funchal, Madeira. This drawing may have been consulted by Fabricius (1787) when he described the species *Cancer quadratus* from Banks's material. (Catalogue number 218.)

NOTES: Fabricius (1775) species *Aranea cruentata* is based solely on material in Banks's collection; he wrote 'Habitat ad Rio Janeiro Brasiliae. *Mus. Dom. Banks.*'. Whether he saw a specimen in Banks's collection or just the drawing is not known but the drawing has type status. However, Fabricius apparently did not label this drawing, nor the others he described which are discussed above.

It is presumed that Dryander's entry of 'Madeira' for this drawing in his Catalogue was a *lapsus calami* for Brazil, as the drawing is so labelled and Fabricius clearly reported the species from that country.

218.(**3**:5) *Sesarma* sp. Grapsidae

DRAWING: finished water-colour by A. Buchan; *r.* [pencil] 'Cancer quadratus/ – mutus L./Buchan'; *v.* [ink] 'Madera'. 170 × 265.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f. 113, as Cancer quadratus, Funchal, Madeira. Dryander – Catalogue f. 215 as finished in colour, *Cancer mutus* L. —— Madeira, A. Buchan.

NOTES: the name *Cancer quadratus* was published by Fabricius (1787) based on a specimen said to have 'Habitat in Jamaica Mus. Dom. Banks'. It is not possible to be certain whether Jamaica was written in error for Madeira; if so, Fabricius's type material was possibly the *Endeavour* specimen and this drawing has type status. At least the specific epithet must have been derived from Solander's manuscript. However, Fabricius later (1798) published *Cancer quadratus* independently on a specimen from 'India orientali, Dom. Daldorff' and this clearly owes nothing to the *Endeavour* material.

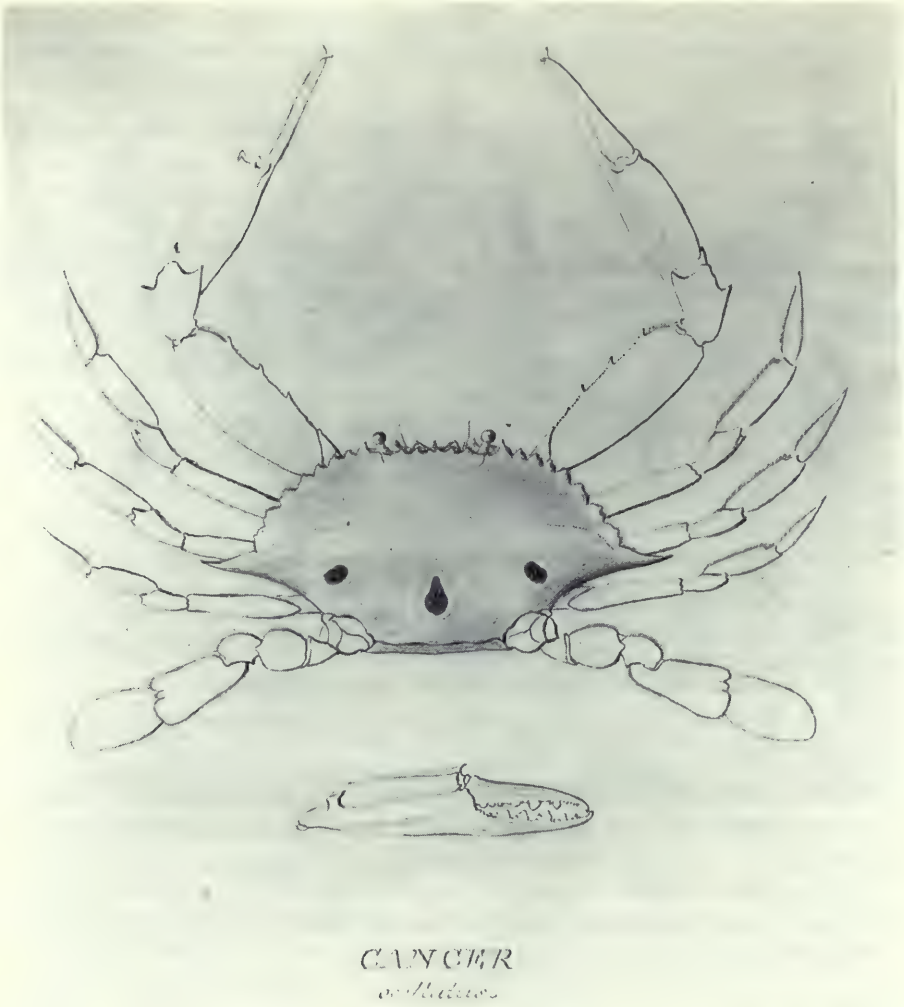

Fig. 16 *Portunus sanguinolentus* (Herbst, 1783). Drawing by Spöring of a swimming crab captured off the Australian coast. (Catalogue number 219.)

219.(**3**:6) *Portunus sanguinolentus* (Herbst, 1783) Portunidae

DRAWING: finished pencil drawing by H. D. Spöring; *r.* [pencil] 'CANCER/ ocellatus'; *v.* [none]. 362 × 344.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.116 as Cancer ocellatus, New Holland. Dryander – Catalogue f.215 as finished without colour Cancer ocellatus Mss —— N.C. (= Nova Cambria), Spöring.

NOTES: the name *Cancer ocellatus* was published by Herbst (1799) but from another specimen collected at Long Island, New York; it appears to have been a quite independent proposal to that of Solander.

220.(**3**:7) *Portunus pelagicus* (Linnaeus, 1758) Portunidae

DRAWING: finished pencil drawing by H. D. Spöring; *r.* [pencil] 'CANCER/ pelagicus'; *v.* [none]. 376 × 372.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.118 as *Cancer pelagicus*, New Holland. Dryander – Catalogue f.215 as finished without colour, *Cancer pelagicus* L —— N.C. (= Nova Cambria), Spöring.

NOTES: Solander had evidently associated the specimen from which this drawing was made with Linnaeus's species, *Cancer pelagicus*. It is drawn on a large sheet of paper which was folded in binding and which had become torn along the fold.

221.(**3**:8) *Polybius henslowii* Leach, 1820 Portunidae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'CANCER Depurator/ Sept. 4. 1768'; *v.* [ink] 'off the coast of Spain. Sept$^{r.}$ 4$^{th.}$ 1768'. 235 × 291.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f. 125 as Cancer depurator, Atlantic Ocean; (D. & W. 42) C.S.D. f.327 as C. Depurator 'Hab. in Oceano Atlantico, ubi non procul a Capite Finnisterra copiose in superficium aqua visus & facile retibus (vulgo cast-nets) captus. Sept. 3, 1768'. Dryander – Catalogue f.215 as finished in colour, *Cancer depurator* L. —— Ocean, A. Buchan.

NOTES: Solander misidentified this, as then undescribed, swimming crab with the Linnaean species *Cancer depurator* (= *Liocarcinus depurator*, see Ingle (1980)). The note quoted from the manuscript (C.S.D.) is one of the few occasions when observations of the behaviour of the animal, and its means of capture, were recorded. It also shows that the artist was working on the material a day after the animal's capture (although it may merely have been signed on completion then). This manuscript account also records the drawing by number (Fig. Pict. N. 11) confirming that the drawings were numbered serially within each region visited, and suggests that there was a master list of drawings by all the artists.

222.(**3**:9) *Munida gregaria* (Fabricius, 1775) Galatheidae

DRAWING: finished water-colour, upper-dorsal view, lower-lateral view; *r.* [ink] 'Cancer gregarius./Sydney Parkinson pinx^{t} 1769'; *v.* [ink] 'Jan$^{y.}$ 2nd 1769/Lat 37.30′.' 292 × 235.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.153 as Cancer gregarius, off Patagonia; (D. & W. 42) C.S.D. f.321 as above, Habitat 'Oceano America australis ubi prope Patagoniam gregatium supra aquam natant, & colore suo rubro sape mare grasi cruentum reddunt (Jan. 2 1768). Lat 45°31′S, Long (Lond.) 61°29′W'. Dryander – Catalogue f.215 as finished in colour, Cancer Pagurus [inserted] gregarius Fabricius —— Ocean, S. Parkinson.

NOTES: Fabricius (1775) based his species *Pagurus gregarius* solely on material in Banks's collection. Whether he examined the specimens collected or merely made use of Parkinson's drawing and Solander's description is not known, but similarities in wording in his account suggest that he closely followed Solander's notes. This

drawing therefore has some standing as type material.

This drawing was reproduced by Wheeler (1983) as Plate 189a.

223.(**3**:10) Megalopal stage of a paguroidean crab. Superfamily Paguridea

DRAWING: finished pencil and wash, left – dorsal view, centre – natural size, right – ventral view; *r.* [ink] 'Cancer amplectans/Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [ink] 'Oct^{r}. 30 1768 Lat. [blank] S.'. 247 × 293.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.142 as Cancer amplectans, Atlantic Ocean off Brazil; (D. & W. 42) C.S.D. 307, 309, same data 'Noctu fulget'. Dryander – Catalogue f.215, as finished without colours, Cancer Pagurus amplectens Fabricius —— Ocean, S. Parkinson.

NOTES: the name *Pagurus amplectens* published by Fabricius (1775) was accompanied by the statement 'Habitat in Oceano atlantico, Brasiliam alluente, noctu fulgens'. Although Fabricius made no reference to Banks's collection for this species the coincidence between the use of the Solander name and the locality data shows that it was based on *Endeavour* material. This drawing therefore has type standing.

The megalop illustrated shows a combination of paguroidean and brachyuran features and its identification is questionable (R. W. Ingle – personal communication).

224.(**3**:11) Megalopal stage of a brachyrhynchan crab. Section Brachyrhyncha

DRAWING: finished pencil and wash, dorsal view; *r.* [none]; *v.* [pencil] 'Cancer cyanopthalmus/[ink] New Holland April 28, 1770'. 292 × 235.

MANUSCRIPT: Solander – none. Dryander – Catalogue f.217 as finished in colour, Cancer —— N.C. (= New Caledonia), S. Parkinson.

NOTES: there are no Solander notes relating to a specimen with the name of Cancer cyanopthalmus, and he may never have described it. The crustacean named *Portunus cyanophthalmus* by Peron (1807) was an independent use of the specific epithet based on a specimen, also from off New Holland 'caught 4 April 1802 – la mer parut coverte d'une charmante espèce de Portune remarquable . . . par la belle couleur bleue de ses deux yeux'.

225.(**3**:12) *Hippolyte caerulescens* (Fabricius, 1775) Hippolytidae

DRAWING: left – finished pencil, dorsal view enlarged, right – finished water-colour, natural size; *r.* [ink] 'Cancer caerulescens./Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [ink] 'Oct^{r}. 7. 1768'. 235 × 284.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.136 as Cancer caerulescens, tropical Atlantic Ocean; (D. & W. 42) C.S.D. f.301, 303, Habitat in Pelago ubi intra Tropicos Oceani Atlantici frequens. Dryander – Catalogue f.217 finished in colour, Cancer Astacus caerulescens Fabr. —— Oc., S. Parkinson.

NOTES: Fabricius (1775) based his name *Astacus caerulescens* on material in Banks's

collection, citing the locality as 'Habitat in Pelago inter Tropicos frequens'. From the similarity in wording it might be assumed that he was quoting from Solander's manuscript, and this drawing has to be accorded some type standing.

226.(**3**:13) Indeterminate euphausiacean or mysidacean. Order Euphausiacea

DRAWING: finished pencil, above – lateral view, below – lateral natural size; *r.* [ink] 'Cancer fulgens./Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Oct^{r}. 30. 1768/Lat S'. 239 × 290.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.145 as Cancer fulgens, off Brasil at surface; (D. & W. 42) C.S.D. f.311 as C. fulgens 'Habitat in Pelago Brasiliam alluente. Noctu fulges'. Dryander – Catalogue f.217, as finished without colour, Cancer Astacus fulgens Fabr. —— Ocean, S. Parkinson.

NOTES: the Solander name *Cancer fulgens* was published by Fabricius (1775), based entirely on material in Banks's collection. Fabricius's ascription 'Habitat in Oceano Brasiliam alluente, noctu fulgens. Mus. Banks.' so nearly coincides with Solander's manuscript that it must have been derived from it. This drawing therefore has some type status.

This illustration was reproduced by Macartney (1810, figs. 1–2) and information on the luminous ability of *Cancer fulgens* communicated by Sir Joseph Banks in Macartney's account of luminous animals.

227.(**3**:14) *Scina crassicornis* (Fabricius, 1775) Scinidae

DRAWING: finished pencil, left – natural size, right – enlarged; *r.* [ink] 'Cancer crassicornis./Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Oct^{r}. 30 [deleted] 1768/Lat S.'. 292 × 236.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.150 as Cancer crassicornis, off Brasil at the surface; (D. & W. 42) C.S.D. f.319, same details, 'Habitat intra tropicos in Pelago Brasiliano'. Dryander – Catalogue f.217 as finished without colour, Cancer Astacus crassicornis Fabricius —— Ocean, S. Parkinson.

NOTES: Fabricius (1775) published the name *Astacus crassicornis* attributing to it the locality 'Habitat in Oceano americano' and the source 'Mus. Banks'. There is no doubt that he referred to Solander's manuscript description which can be presumed to have been derived from the specimen Parkinson drew, and this drawing therefore has type standing.

Parkinson's drawing was referred to by Stebbing (1888), while it was under the care of Dr Albert Günther, then Keeper of the Department of Zoology, and he wrote '*Astacus crassicornis* of Fabricius is the earliest described species of the genus ... while it is beyond all question that Sydney Parkinson's figure of Cancer crassicornis is the earliest known representation of any species of that genus'. Stebbing, however, referred only to Fabricius for the text on the species and appears not to have referred to Solander's more detailed description in his manuscript.

This drawing was reproduced by Wheeler (1983) at Plate 189c.

228.(**3**:15) *Lysierichthus vitreus* (Fabricius, 1775) Lysiosquillidae

DRAWING: finished pencil, left – enlarged dorsal view, centre – natural size, lateral view, right – enlarged ventral view; *r.* [ink] 'Cancer vitreus/Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Coast of Brasil'. 239 × 294.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.165 as Cancer vitreus, off Brasil, at surface; (D. & W. 42) C.S.D. f.337 as C. vitreus, Habitat in Pelago Oceani Atlantici non procul a Brasilia. Dryander – Catalogue f.217, as finished without colour, Cancer Squilla vitrea Fabricius —— Brasil, S. Parkinson.

NOTES: Fabricius (1775) based his species *Astacus vitreus* on material in Banks's collection, most probably the drawing and manuscript account by Solander. This drawing therefore has type status. *Lysierichthus* is a larval generic name within the stomatopod crustaceans. It is possibly the larval stage of *Lysiosquilla scabricauda* (Lamarck, 1818) according to Gurney (1946) and Manning (1969).

This drawing was reproduced by Wheeler (1983) at Plate 189b.

229.(**3**:16) *Lysierichthus vitreus* (Fabricius, 1775) Lysiosquillidae
Diodon hystrix Linnaeus, 1758 Diodontidae
Conchoderma virgatum var. *hunteri* Darwin, 1851 Lepadidae

DRAWING: pencil sketches, unfinished water-colour of *Diodon* (lateral view); dorsal and ventral views of *Lysierichthus*; four lateral views of *Conchoderma*; *r.* [ink] 'C. vitreus/Diodon Erinaceus/Lepas pelluscens'; *v.* [none]. 286 × 235.

DRAWING: see Notes.

NOTES: these are clearly preliminary studies for the finished drawings of the three animals. For details of these finished drawings see entries 73 (*Diodon*), 228 (*Lysierichthus*), and 290 (*Conchoderma*) in this catalogue.

230.(**3**:17) *Caligus corpyphaenae* Steenstrup & Lütken, 1861 Caligidae

DRAWING: finished pencil and wash; left (Fig. 1) – ventral view, centre (Fig. 3) – natural size, right (Fig. 2) – dorsal view; *r.* [ink] 'Monoculus piscinus/Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Oct^{r} 1768/L. N'. 239 × 296.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.182 as Monoculus piscinus, on Scomber pelamidi, Atlantic Ocean; (D. & W. 42) C.S.D. f.347–349 as above. Dryander – Catalogue f.219 as finished without colour, Monoculus piscinus L. —— Ocean, S. Parkinson.

NOTES: *Monoculus piscinus*, the name used by Solander, was a Linnaean name dating from 1761; it is generally considered to be a composite taxon. This drawing was made from a specimen taken from a scombroid fish, presumably the skipjack tuna, *Katsuwonus pelamis* (Linnaeus, 1758) – see number 187 in this catalogue – from which two internal parasites were also described.

231.(**3**:18*a*) Unidentified hyperioid amphipod Phronimidae

DRAWING: finished pencil; seven views, numbered Fig. 1 to Fig. 7, of different

aspects or parts of the amphipod, various appendages lettered; *r.* [ink] 'Onidium gibbosum/P/T.15 P. Sept. 7. 1768'; *v.* [none]. 122 × 234.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.198 as Onidium gibbosum, near Portugal, Atlantic Ocean, inside *Dagysas*; (D. & W. 42) C.S.D. f.359, same data. Dryander – Catalogue f.219 as finished without colour, Onidium gibbosum mss —— Ocean, S. Parkinson.

NOTES: Fabricius's (1775) description of *Oniscus gibbosus* established this taxon on the sole basis of the Parkinson drawing, for his description includes the statement 'Habitat in Oceano Lusitanico. Fig.pict. in Mus. Bankiano'. This appears to suggest that he made no use of Solander's manuscript description, a surprising omission if true. As Stebbing (1888) points out this *Endeavour* material was the earliest to be figured (and described) of any of this group, i.e. in what he called the family Typhidae. It also appears to be the first recorded observation of the possibly symbiotic relationship between an hyperiid amphipod and a salp (Solander's *Dagysas*).

232.(**3**:18*b*) Unidentifiable hyperiid amphipod Hyperiidae

DRAWING: finished pencil drawing; Fig. 1, left – dorsal view, Fig. 2, right – natural size lateral view; *r.* [ink] 'Onidium oblongatum/P/T.16 P Sept. 7. 1768'; *v.* [no annotation; two sketches of an amphipod]. 119 × 235.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.202, as Onidium oblongatum, Atlantic Ocean inside *Dagysas*; (D. & W. 42) C.S.D. f.361 'Habitat in Oceano Atlantico, communis cum *Onidio gibboso* inter Dagysas, quas permeat vulneratque (Sept 6, 1768)'. Dryander – Catalogue f.219 as finished without colour, Onidium oblongatum Mss —— Ocean, S. Parkinson.

NOTES: Stebbing (1888) refers to this drawing, having examined it (as he did the other amphipod drawings) but beyond referring to it as one of the Hyperina wrote that it was 'without sufficient enlargement to show clearly the position of the species . . .'. This, and the other drawings of hyperiid amphipods, were some of the earliest made by Parkinson on the voyage, and show the meticulous detail of his work with microscopic subjects.

Solander's name Onidium oblongatum appears not to have been employed by later naturalists.

233.(**3**:18*c*) *Hyperia medusarum* (O. F. Muller, 1776) Hyperiidae

DRAWING: finished pencil and water-colour; Fig. 1, left-side view, Fig. 2, right-oblique front view; *r.* [ink] 'Onidium quadricorne./[pencil] Sydney Parkinson pinx^{t} ad vivum 1768/[ink] T.2.P.2. August.28. 1768'; *v.* [none]. 122 × 235.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.363 as Onidium quadricorne 'Habitat in mari Atlantico, inter Hiberniam & Galliam et prope litore Gallicia'. Dryander – Catalogue f.219 as finished in colour, Onidium quadricorne Mss —— Ocean, S. Parkinson.

NOTES: Fabricius (1775) published the Solander name as *Oniscus quadricornis* 'Habitat in mari Atlantico. Mus. Banks'; this drawing therefore has standing as type material. Stebbing (1888) in an appendix to the bibliography in his work on the Amphipoda of the *Challenger* expedition, lists all the relevant Parkinson drawings and discusses their taxonomic significance. He therefore recognized that *Onidium quadricorne* was a synonym of O. F. Muller's *Hyperia medusarum* (which name is given here) but misattributed the former species to Fabricius (1781) whereas as it was published in 1775 it has priority over Muller's name.

234.(**3**:19) *Cystosoma spinosum* (Fabricius, 1775) Cystosomatidae

DRAWING: finished pencil, left – ventral view, centre – dorsal view, right – lateral view, all enlarged and with appendages lettered; *r.* [ink] 'Onidium spinosum/ Sydney Parkinson pinx^{t} 1768'; *v.* [unfinished pencil sketches of same species/'Oct^{r}. 7th. 1768/Lat. N.'. 270 × 374.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.206 as Onidium spinosum, Atlantic Ocean; (D. & W. 42) C.S.D. f.365, same data Latitude Sept. IX.43. Dryander – Catalogue f.219 as finished without colour, Onidium spinosum mss —— Ocean, S. Parkinson.

NOTES: Fabricius (1775) described *Oniscus spinosus* as 'Habitat in Oceano Atlantico. Mus. Dom. Banks'; this drawing therefore has type standing. This figure was examined and referred to by Stebbing (1888).

235.(**3**:20) *Cystosoma spinosum* (Fabricius, 1775) Cystosomatidae

DRAWING: unfinished pencil, left – ventral view, centre – dorsal view, right – lateral view, all enlarged and with appendages lettered; *r.* [ink] 'Onidium spinosum'; *v.* [none]. 236 × 290.

MANUSCRIPT: see number 234 in this catalogue.

NOTES: this must have been a preliminary sketch for number 234 in this catalogue.

236.(**3**:21*a*) *Sapphirina* sp. Sapphirinidae

DRAWING: finished pencil and wash, left, Fig. I – dorsal view, centre, F. III – dorsal view natural size, right, Fig. II – ventral view, all with appendages lettered; *r.* [ink] 'Carcinium-opalinum/Sydney Parkinson pinx^{t} ad vivum Sep^{r} 5th 1768/ [unclear] Sept 5 1768'; *v.* [none]. 125 × 230.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.192 as Carcinium opalinum, Atlantic Ocean, near France; (D. & W. 42) C.S.D. f.353 as above, September 4, 1768. Dryander – Catalogue f.221 as finished without colour, Carcinium copallinium (*sic*) mss —— Ocean, S. Parkinson.

NOTES: the name *Carcinum opalinum* was published in Hawkesworth's (1773) account of the voyage of the *Endeavour*, attributed by C. D. Sherborn (*Index Animalium, 1880–1850*) to Banks and Solander, although there is no evidence to suggest that Banks was involved in the analysis of the animal other than through

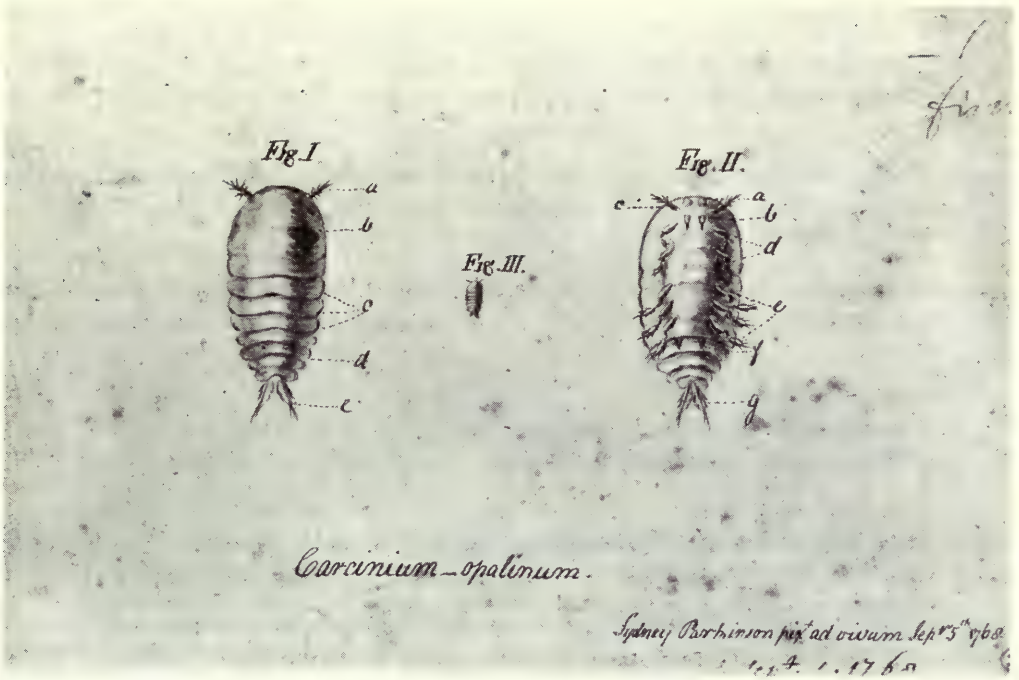

Fig. 17 *Sapphirina* sp. A detailed drawing by Parkinson of a copepod, the brilliant coloration of which was noted by Banks and Solander in Hawkesworth's (1773) account of the voyage. (Catalogue number 236.)

patronage. Hawkesworth wrote under September 1768 'Another animal of a new genus they also discovered, which shone in the water with colours still more beautiful and vivid, and which indeed exceeded in variety and brightness any thing that we had ever seen: the colouring and splendour of these animals were equal to those of an Opal, and from their resemblance to that gem, the genus was called *Carcinium Opalinum*'.

The drawing is not identifiable to species.

237.(**3**:21*b*) *Sapphirina* sp. Sapphirinidae

DRAWING: finished pencil and wash, left, Fig. 2 – ventral view of ovigerous female, centre, Fig. 3 – dorsal view natural size, right, Fig. 1 – dorsal view, both drawings 1 and 2 with appendages lettered; *r*. [ink] 'Carcinium macrourum/Sydney Parkinson pinx^{t} ad vivum Sept^{r} 7th 1768/Sept. 6. 1768.'; *v*. [none]. 125 × 231.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera f.194 as Carcinium macrouram, Atlantic Ocean near Spain; (D. & W. 42) C.S.D. f.355, as above, 'Habitat in mari Atlantico Galliciam alluente Sept.4. 1768'. Dryander – Catalogue f.221 as finished without colour, Carcinium macrourum mss —— Ocean, S. Parkinson.

NOTES: the Solander name Carcinium macrourum does not appear to have been taken up by later naturalists.

238.(**3**:21*c*) *Idotea* sp. Idoteidae

DRAWING: finished water-colour by A. Buchan; above – dorsal view, below – ventral view; *r.* [ink] 'ONISCUS chelipes/Sept.2. 1768'; *v.* [none]. 113 × 230.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Diptera & Aptera as Oniscus chelipes, in algae off France, Atlantic Ocean; (D. & W. 42) C.S.D. as *O. chelipes* with references to Pallas and Baster. Dryander – Catalogue f.221 as finished in colour, Oniscus chelipes mss —— Ocean, S. Parkinson.

NOTES: the name *Oniscus chelipes* was proposed by Pallas in 1766 and Solander was clearly employing Pallas's name.

239.(**3**:22) *Hepatoxylon trichiuri* (Holten, 1802) Hepatoxylidae

DRAWING: finished pencil, three views; *r.* [ink] 'Fasciola tenacissima/Sydney Parkinson pinx^{t} 1769'; *v.* [none]. 235 × 291.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.14 as Fasciola tenacissima, in Squalus glaucus, southern ocean, 11 April 1769; (D. & W. 42) f.423 as above 'intra intestina Squalus glauci'. Dryander – Catalogue f.223 as finished without colour, Fasciola tenuissima mss —— Ocean, S. Parkinson.

NOTES: this larval cestode worm was found in the intestine of the blue shark, *Prionace glauca* (Linnaeus, 1758), which was caught near Osnabrugh Island, now Mururoa, south of the Tuamotu group. The fish was drawn by Parkinson, see numbers 53 and 54 in this catalogue.

240.(**3**:23) *Glaucus atlanticus* Forster, 1800 Glaucidae

DRAWING: finished water-colour; left – enlarged with lettering, right – natural size; *r.* [ink] 'Mimus Volutator/Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* 'Oct^{r}. 4. 1768/Lat. 11.00 N'. 240 × 220.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.23 as Mimus volutator, Atlantic Ocean 4 October 1768, southern ocean 13 March 1769, 11 April 1770; (D. & W. 42) C.S.D. f.413, same data and 'prope novam Hollandiam Lat 35°30′S' (23 April 1770). Dryander – Catalogue f.225 as finished in colour, Mimus volutator mss —— Ocean, S. Parkinson.

NOTES: this pelagic mollusc was described by J. R. Forster in a communication to J. F. Blumenbach (1800). His specimen was collected in the Atlantic Ocean during the *Resolution* voyage.

241.(**3**:24) Unidentified flatworm Class Turbellaria

DRAWING: finished pencil, left Fig. A – dorsal view, centre Fig. C – dorsal view natural size, right Fig. B – ventral view (both A and B are enlarged); *r.* [ink] 'Doris complanata/A, Animal supra/B, — subtus [A and B bracketed] microscopis auctum/C, — supra magnitudine naturali/[captions to letters on figure]/Sydney Parkinson pinx^{t} 1769'; *v.* [ink] 'S. Sea Lat. 29.00. Long. 129:20:/Sept^{r} 19. 1769'. 235 × 293.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.26 as Doris complanata, southern ocean 19 September 1769 and 13 April 1770; (D. & W. 42) C.S.D. f.409 Lat 29°10′S, Long 159°20′W (Sept. 17. 1769) and Lat. 39°27′S Long. 204°10′W (Apr. 13, 1770). Dryander – Catalogue f.225 as finished in colour, Doris complanata Mss —— Ocean, S. Parkinson.

NOTES: the name Doris complanata proposed by Solander seems never to have been employed by later naturalists. *Doris* was a Linnaean (1758) genus name in Mollusca.

242.(**3**:25) Opisthobranch mollusc — Chromodorididae

DRAWING: unfinished pencil; *r.* [none]; *v.* [pencil] 'The narrow outer edge white the next broad & rich orange then white & so blk & white alternately in the middle the/lower part of the animal the same except that it wants the narrow white edge [;] the feelers & tentacula/Vermillion – the bottom is a violet blk./Doris/[ink] Endeavours River'. 267 × 371.

MANUSCRIPT: Solander – not recognized in any manuscript. Dryander – Catalogue f.225 as sketch without colours, Doris —— New Caledonia, S. Parkinson.

NOTES: the identification of this opisthobranch is uncertain partly on account of the quality of the illustration; it may belong to the genus *Chromodoris*, and superficially resembles *Chromodoris quadricolor*, an Indo-Pacific species illustrated by Thompson (1976).

243.(**3**:26) Unidentified actinarian — order Actinaria

DRAWING: finished water-colour, left – upper side, centre – side view, right – under side; *r.* [ink] 'Actinia natans/Sydney Parkinson pinx^{t} 1770'; *v.* [ink] 'South Sea April y^{e} 18th 1770'. 237 × 295.

MANUSCRIPT: (D. & W. 45) S.C. Mollusca 1, f.44 as Actinia natans, southern ocean, 12 April 1770; (D. & W. 42) C.S.D. f.481, same data, Lat. 39°20′S, Long. 204°8′W. Dryander – Catalogue f.227 as finished in colour, Actinaria natans mss —— Ocean, S. Parkinson.

NOTES: this sea anemone is otherwise unidentifiable; the Solander name Actinaria natans seems not to have been taken up by later naturalists.

244.(**3**:27*a*) *Thalia* sp. — Salpidae

DRAWING: finished pencil, with water-colour, left Fig. I – enlarged with parts lettered, right Fig. II – natural size; *r.* [ink] 'Dagysa gemma/Sydney Parkinson pinx^{t} ad vivum. Sept^{r} 3rd 1768'; *v.* [ink] 'Sept^{r} 2. 1768'. 130 × 240.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.50 as Dagysa gemma on five occasions between 2 September 1768 and 23 April 1770; (D. & W. 42) C.S.D. f.485, same data. Dryander – Catalogue f.229 as finished in colour, Dagysa Gemma mss —— Ocean, S. Parkinson.

NOTES: the genus name *Dagysa*, which Banks and Solander used for all salps was published in Hawkesworth (1773) in his official account of the *Endeavour* voyage. Dagysa gemma, the Solander name, has not been taken up by later authors.

245.(**3**:27*b*) *Pegea* sp. Salpidae

DRAWING: finished pencil and water-colour, three views, one (Fig. III) of a chain of aggregated zooids; *r.* [ink] 'Dagysa saccata/Sydney Parkinson pinx^{t} ad vivum Sept^{r} 6th. 1768'; *v.* [ink] 'Sept^{r} 5 1768'. 235 × 259.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.53 as Dagysa saccata, Atlantic Ocean near Spain, 3 September 1768; (D. & W. 42) C.S.D. f.489 as above, August and September 1768. Dryander – Catalogue f.227 as finished in colour, Dagysa saccata mss —— Ocean, S. Parkinson.

NOTES: this Solander name appears not to have been taken up by later naturalists.

Fig. III shows a chain of aggregated zooids probably referable to *Pegea confoederata* (Forsskål, 1775); the two other drawings are of solitary zooids presumed to be individuals of the same species.

246.(**3**:28) *Salpa* ? *fusiformis* Cuvier, 1804 Salpidae

DRAWING: finished pencil and water-colour; *r.* [ink] 'Dagysa volva/Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [ink] 'Oct^{r}. 3rd. 1768/Lat. 11:11 N.'. 240 × 291.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.55 as Dagysa volva, Atlantic Ocean, 3 October 1768; (D. & W. 42) C.S.D. 491, same data. Dryander – Catalogue f.227 as finished in colour, Dagysa Volva mss —— Ocean, S. Parkinson.

NOTES: the name Dagysa volva seems not to have been taken up by other naturalists. This drawing was copied exactly for Richard Owen's collection of drawings (Owen Colln folio 77). The copy is exact down to the signature and date which caused Ingles & Sawyer (1979) to assume it was a Parkinson original. However, Owen can be exonerated from the suspicion of purloining drawings from the Banks Collection, as the paper on which his drawing is made is watermarked J. Whatman 1805.

247.(**3**:29) *Sulculeolaria* sp. Diphyidae

DRAWING: unfinished pencil, upper enlarged view, lower probably natural size; *r.* [ink] 'Dagysa limpida/Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Oct^{r} 4th 1768/Lat. 09:00N'. 239 × 294.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.57 as Dagysa limpida, Atlantic Ocean, 4 October 1768; (D. & W. 42) C.S.D. f.493, same data. Dryander – Catalogue f.229 as finished without colour, Dagysa limpida mss —— Ocean, S. Parkinson.

NOTES: this drawing shows very little detail but apparently represents the posterior nectophore of this siphonophore. The name Dagysa limpida appears never to have been used by later naturalists.

248.(**3**:30) *Cyclosalpa pinnata* (Forsskål, 1775) Salpidae

DRAWING: finished pencil and water-colour; four drawings; *r.* [ink] 'Dagysa lobata/Sydney Parkinson pinx$^{t.}$ ad vivum Sept 7$^{th.}$ 1768'; *v.* [ink] 'Sep$^{tr.}$ 6$^{th.}$ 1768'. 240 × 294.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.58 as Dagysa lobata, Atlantic Ocean, 4 September 1768; (D. & W. 42) C.S.D. f.495, same data. Dryander – Catalogue f.227 as finished in colour, Dagysa lobata mss —— Ocean, S. Parkinson.

NOTES: the four drawings represent a whorl of aggregated zooids (Fig. 4), two views of a separate aggregated zooid (with luminous organs picked out in colour and labelled 'g') (Figs. 1 & 2), and a natural size specimen (Fig. 3).

The name Dagysa lobata has not been used by later naturalists.

249.(**3**:31*a*) *Thalia* sp. Salpidae

DRAWING: finished pencil; four views; *r.* [ink] 'Dagysa cornuta/[pencil] Sydney Parkinson pinx^{t} ad vivum Sept^{r} 2nd 1768'; *v.* [ink] 'Sept$^{r.}$ 2$^{nd.}$ 1768'. 135 × 235.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.60 as Dagysa cornuta, Atlantic Ocean, 2 September & 6 September 1768, 6 October 1769; (D. & W. 42) C.S.D. f.497 same dates and 11 April and 23 April 1770. Dryander – Catalogue f.229 as finished without colour, Dagysa cornuta mss —— Ocean, S. Parkinson.

NOTES: the name Dagysa cornuta does not seem to have been employed by later naturalists.

250.(**3**:31*b*) *Chelophyes* sp. Diphyidae

DRAWING: finished pencil and water-colour; side view; *r.* [ink] 'Dagysa vitrea/ Sydney Parkinson pinx^{t} 1768'; *v.* [ink] 'Oct$^{r.}$ 7$^{th.}$ 1768/[indecipherable]'. 230 × 255.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.62 as Dagysa vitrea, Atlantic Ocean 7 October 1768, southern ocean 3 February 1769 & 13 April 1770, f.64, name only; (D. & W. 42) C.S.D. f.499, same data. Dryander – Catalogue f.227 as finished in colours, Dagysa vitrea mss —— Ocean, S. Parkinson.

NOTES: the name Dagysa vitrea seems not to have been employed by later naturalists. This appears to be a finished drawing, lettered for captions, by its date made on the first occasion the animal was captured; later drawings are listed under 251 in this catalogue.

251.(**3**:32) *Chelophyes* sp. Diphyidae

DRAWING: finished pencil, one with water-colour; *r.* [ink] 'Dagysa vitrea/Sydney

Parkinson pinx^{t} 1769'; *v.* [ink] 'March 3$^{d.}$ 1769. Lat 36.49′/Long. 111.30′ W.'. 238 × 295.

MANUSCRIPT: Solander – see above, no.250. Dryander – Catalogue f.227 as finished without colour, —— Ocean, S. Parkinson.

NOTES: these four drawings of the siphonophore were made in the southern Pacific, but the date does not coincide with any of the dates given by Solander (see above), unless 3 March 1769 was written in error for 3 February.

252.(**3**:33) *Thetys vagina* Tilesius, 1802 Salpidae

DRAWING: finished pencil and water-colour; *r.* [ink] 'Dagysa rostrata./Sydney Parkinson pinx^{t} ad vivum Sept^{r} 8th 1768/T.13 P.8 Sept. 6. 1768'; *v.* [ink] 'Sept$^{r.}$ 6$^{th.}$ 1768'. 234 × 292.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.66 as Dagysa rostrata, Atlantic Ocean 1768, southern ocean 2 October 1769; (D. & W. 42) C.S.D. f.503, as above 'Mari Atlantico Hispaniam alluente prope fretum herculis . . ., in Oceano Australis, Lat 37°10′S, Long 171°5′W . . .'. Dryander – Catalogue f.227 as finished in colours, Dagysa rostrata mss —— Ocean, S. Parkinson.

NOTES: Solander's name Dagysa rostrata appears not to have been used by later naturalists. This beautifully executed drawing is fully captioned by letters to relate to the description. The annotation T.13 P.8 shows it to have been drawn on the first leg of the voyage, when other Parkinson drawings were similarly labelled. The 'fretum herculis' of Solander's description refers to the pillars of Hercules, said to have stood at the western entrance to the Mediterranean.

253.(**3**:34) *Thetys vagina* Tilesius, 1802 Salpidae

DRAWING: finished pencil and water-colour; *r.* [ink] 'Dagysa strumosa./Sydney Parkinson pinx^{t} ad vivum Sept^{r} 8th 1768'; *v.* [none]. 230 × 294.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.68 as Dagysa strumosa, Atlantic ocean near Straits of Gibraltar, off New Holland 23 April 1770; (D. & W. 42) C.S.D. f.505 as above, New Holland = 35°36′S. Dryander – Catalogue f.227 as finished in colour, Dagysa strumosa mss —— Ocean, S. Parkinson.

NOTES: the Solander name Dagysa strumosa appears not to have been employed by any later naturalist. It is surprising that Solander should have recognized two nominal species from specimens in the same area and only two days apart.

254.(**3**:35) *Iasis zonaria* Salpidae

DRAWING: finished pencil; three views; *r.* [ink] 'Dagysa serena/Sydney Parkinson pinx$^{t.}$ 1769'; *v.* [pencil] 'Dagysa serena/South Sea Oct^{r} 2 1769'. 238 × 280.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.70 as Dagysa serena, southern ocean 2 October 1769, 11 January 1770; (D. & W. 42) C.S.D. f.507, same data, latitude and longitude given. Dryander – Catalogue f.229 as finished without colours, Dagysa serena mss —— Ocean, S. Parkinson.

NOTES: Solander's name Dagysa serena appears not to have been taken up by later naturalists.

255.(**3**:36*a*) *Halistemma* sp. Agalmidae

DRAWING: finished pencil; three views; *r.* [ink] 'Dagysa polyedra/Sydney Parkinson pinx[t] 1769'; *v.* [pencil] 'Dagysa polyedra/[indecipherable]'. 200 × 270.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.72 as Dagysa polyedra, southern ocean, 2 October 1769; (D. & W. 42) C.S.D. f.511, same data. Dryander – Catalogue f.229 as finished without colour, Dagysa polyedra mss —— Ocean, S. Parkinson.

NOTES: the name Dagysa polyedra seems not to have been used by later naturalists. Two of the views on this drawing are captioned by letters and the three figures are discussed in Solander's manuscript (D. & W. 42).

256.(**3**:36*b*) Unidentified salp. Order Salpida

DRAWING: unfinished pencil; *r.* [ink] 'Dagysa costata'; *v.* [ink] 'Rio Janeiro'. 164 × 148.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.229 as finished in colour, Dagysa costata mss —— Rio Janeiro, S. Parkinson.

NOTES: Dryander appears to have been mistaken in claiming this drawing to be finished in colour; there is no water-colour in it. This is the only drawing of Banks and Solander's 'Dagysas' not also to be described; several other Brazilian animals were drawn but not described, presumably because the naturalists were absorbed with their botanical studies at this landfall.

257.(**3**:37) *Physalia physalis* (Linnaeus, 1758) Physaliidae

DRAWING: finished water-colour; *r.* [ink] 'Holothuria Physalis/Sydney Parkinson pinx[t] ad vivum.'/*v.* [none]. 371 × 269.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.80 as *Holothuria physalis*, Atlantic Ocean; f.83 surface between the Tropics, 7°S lat; f.84 Atlantic Ocean 22 & 23 December 1768; (D. & W. 42) C.S.D. f.391 and f.393. Dryander – Catalogue f.229, one of two finished in colour, *Holothuria physalis* L. —— Ocean, S. Parkinson.

NOTES: Solander recognized the siphonophore, known as the Portuguese Man-of-War, from Linnaeus's earlier description of *Holothuria physalis* which was based on a number of descriptions and figures given by earlier voyagers including Hans Sloane and Patrick Browne, both travellers to Jamaica, and his own former student Per Osbeck who visited the East Indies in 1750 to 1752. Solander and Banks studied *Physalia* closely and made the earliest observations on the nematocysts, and the manner in which these organisms steer by means of the sail-like membrane. This and subsequent drawings show the membrane in various sailing postures.

Totton (1960) refers to Parkinson's drawings in discussing the history of knowledge of the morphology of *Physalia*, and quotes extensively from Banks's notes on the siphonophore. Moreover he claimed that a specimen in the British Museum (Natural History) register number 1925.8.13.2, preserved in alcohol was a specimen from the *Endeavour* voyage. The label *Holothuria physalis*, was indicative of this, and the handwriting and label design corresponded well with contemporary labels on fishes known to have been captured during the voyage, which I was able to show him. Whether he was correct in claiming it to be the specimen captured on 7 October 1768 south of the Cape Verde Islands, and not one of the later captures, there is no means of knowing.

This drawing was reproduced by Lysaght (1980) at Plate XIVb.

258.(**3**:38) *Physalia physalis* (Linnaeus, 1758) Physaliidae

DRAWING: finished water-colour; *r.* [ink] 'Holothuria Physalis./Sydney Parkinson pinx$^{t.}$ 1768./[pencil] pepete tata'; *v.* [none]. 371 × 270.

MANUSCRIPT: see above, number 257 in this catalogue.

NOTES: see number 257 above.

259.(**3**:39) *Physalia physalis* (Linnaeus, 1758) Physaliidae

DRAWING: unfinished water-colour; *r.* [none]; *v.* [ink] 'Dec$^{r.}$ 23 1768/Lat. 37 South./[pencil] N° 4. Holothuria angustata'. 365 × 262.

MANUSCRIPT: Solander – (D. & W. 42) C.S.D. f.395 as Holothuria angustata, habitat in Oceano Atlantico America australis, Lat. aust. gr 37° (December 22, 23, 1768). Dryander – Catalogue f.229 as finished in colours, Holothuria angustata mss —— Ocean, S. Parkinson.

NOTES: Solander apparently considered that the specimens of this siphonophore collected in the South Atlantic were different from Linnaeus's *Holothuria physalis*. His name H. angustata seems never to have been taken up by later naturalists. However, the notes in (D. & W. 45) S.C. Mollusca 1, f.84 refer to *H. physalis* being captured on 22 and 23 December 1768, and these must refer to the specimen drawn. Totton (1965) regarded the genus *Physalia* as monotypic.

260.(**3**:40) *Physalia physalis* (Linnaeus, 1758) Physaliidae

DRAWING: unfinished pencil sketches of six colonies, plus details of tentacles; *r.* [ink] 'S. Parkinson'; *v.* [ink] 'Dec$^{r.}$ 23. 1768/Lat 37 South/[pencil] N$^{o.}$ 4 Holothuria angustata'. 374 × 264.

MANUSCRIPT: see above, no.259 in this catalogue. Dryander – Catalogue f.229 sketch with colours —— Ocean, S. Parkinson.

NOTES: see number 259 in this catalogue.

261.(**3**:41) *Physalia physalis* (Linnaeus, 1758) Physaliidae

DRAWING: pencil with some water-colour of two colonies; *r.* [ink] 'S. Parkinson';

v. [pencil] 'The bladder of this animal is quite transparent/11 Holothuria obtusata/ March 3[d] 1769 Lat. 36. 49′ L. 113. 3′.' 295 × 236.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.86 as Holothuria obtusa, Pacific Ocean, 3 February 1769, 11 January, 11 & 23 April 1770; (D. & W. 42) C.S.D. f.397 same data, except February 13, 1769 is given, and . . . 'an junior H. Physalis Lin. et Mscr?' added. Dryander – Catalogue f.229 as sketch with colours, Holothuria obtusata mss —— Ocean, S. Parkinson.

NOTES: this is the third of the nominal species of *Physalia* which Solander recognized; the name seems not to have been used by later workers.

262.(**3**:42) *Ocyropsis* sp. Ocyropsidae

DRAWING: finished pencil; *r.* [ink] 'Callirrhoe bivia/S. Parkinson pinx[t] 1768'; *v.* [ink] 'Lat. [indecipherable]'. 142 × 236.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.99 as Calliroe bivia surface of tropical Atlantic; (D. & W. 42) C.S.D. f.401 same data, Latitude 7°N. Dryander – Catalogue f.231 as finished without colour, Callirhoe bivia mss —— Ocean, S. Parkinson.

NOTES: the genus name *Callirhoe* was published by Peron & Lesueur (1810) to include two species, *Callirhoe micronema* from the north-east coast of New Holland, and *C. basteriana* from the Dutch coast. They made no reference to Solander's manuscript name and must have derived the name independently. Their observations on the species from New Holland were presumably made during the voyage on the French corvettes *Le Géographie* and *Le Naturaliste* on the expedition led by Baudin. Although C.-A. Lesueur examined the Parkinson drawings and annotated some this was probably after the publication of his (and Peron's) work on medusa, when in 1815 he visited London en route for North America (Goy, 1980).

263.(**3**:43) *Athorybia rosacea* (Forsskål, 1775) Athorybiidae

DRAWING: finished water-colour, two views plus detail of tentacles; *r.* [ink] 'Medusa rutilans/Sydney Parkinson pinx[t] ad vivum 1768./[pencil] voisine lui Lisophisa rosacea. L.S. tableau du radiaire molasses Compoter'; *v.* [ink] 'Oct[r]. 1768/between the tropicks'. 266 × 374.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.102 as Medusa rutilans, Atlantic Ocean between the Tropics; (D. & W. 42) C.S.D. f.445, same data. Dryander – Catalogue f.233 as finished in colour, Medusa rutilans mss —— Ocean, S. Parkinson.

NOTES: the annotation in French refers to Peron & Lesueur's (1810) established family of 'Radiaires molasses compotés', but they did not refer to the name Medusa rutilans. It was written by Lesueur.

This drawing was reproduced by Wheeler (1983) as Plate 186, and by Totton (1954) as Plates II and III.

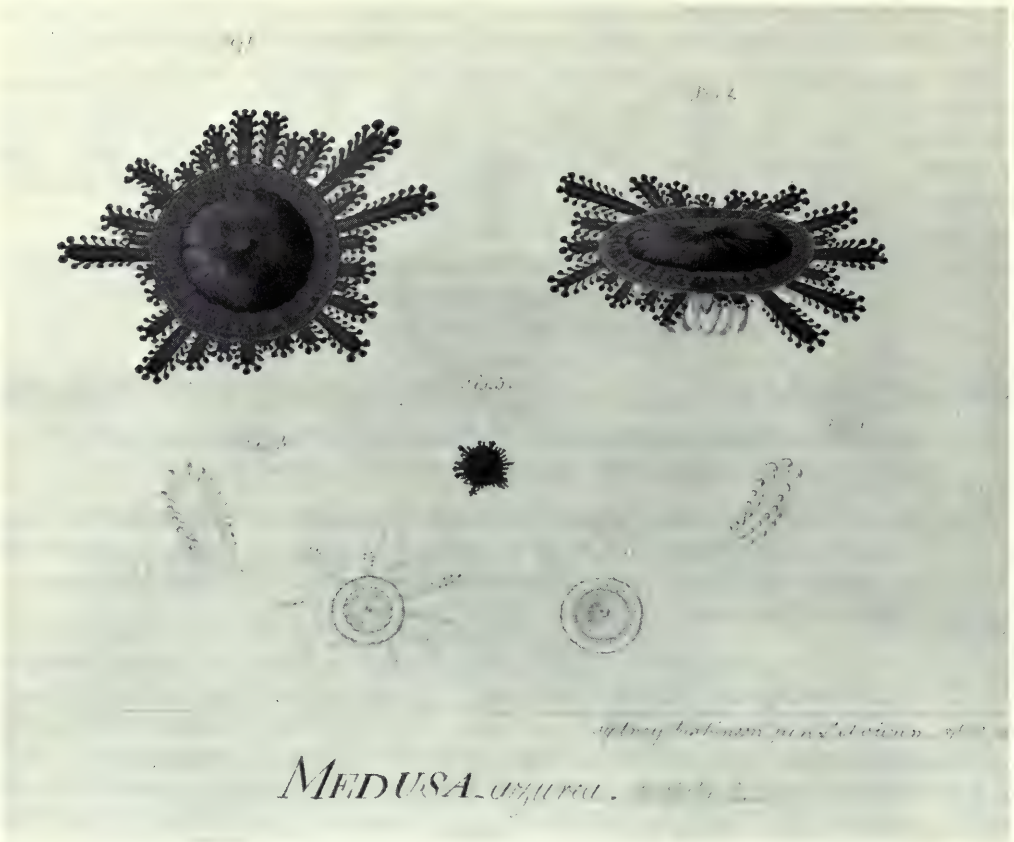

Fig. 18 *Porpita porpita* (Linnaeus, 1758). Parkinson's only drawing on vellum in the *Endeavour* zoological drawings, made between Madeira and the Canary Islands. (Catalogue number 264.)

264.(**3**:44) *Porpita porpita* (Linnaeus, 1758) Velellidae

DRAWING: finished water-colour on vellum, two views enlarged, one view natural size, four studies of detail; *r.* [ink] 'MEDUSA azurea. [pencil] porpita Linné/ Sydney Parkinson pinx^{t} ad vivum 1768 Sept'; *v.* [none]. 198 × 256.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f. 104 as *Medusa porpita*, Atlantic between Madeira and the Canary Islands; southern ocean 13 April 1770; (D. & W. 42) C.S.D. f.447 same data, the Pacific Ocean locality given as Lat. 39°27′S Long 204°10′W. Dryander – Catalogue f.233 as finished in colour, *Medusa porpita* L. —— Ocean, S. Parkinson.

NOTES: Solander's name Medusa azurea does not seem to have been used by later naturalists. However, the reidentification to *M. porpita* Linné must have been made at a relatively early date for it to have been listed by Dryander under this name. This is the only zoological drawing from the *Endeavour* voyage to have been drawn on vellum.

265.(**3**:45) *Porpita porpita* (Linnaeus, 1758) Velellidae

DRAWING: finished pencil drawings, three views; *r.* [ink] 'Medusa porpita./ Sydney Parkinson pinx[t] ad vivum 1768'; *v.* [ink] 'Near the line in the Atlantic'. 240 × 293.

MANUSCRIPT: Solander – see above, no.264 in this catalogue. Dryander – Catalogue f.233 as finished without colour, Medusa Porpita L. —— Ocean, S. Parkinson.

NOTES: see above, no.264 in this catalogue.

266.(**3**:46) *Chrysaora quinquecirrha* (Desor, 1848) Pelagiidae

DRAWING: finished pencil drawing; *r.* [ink] 'Medusa punctulata./Sydney Parkinson pinx[t] ad vivum 1768./[pencil] apartenant au genre Crysaore'; *v.* [ink] 'Brasil'. 371 × 268.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.107 as Medusa punctulata, Rio de Janeiro; (D. & W. 42) C.S.D. f.449, same data. Dryander – Catalogue f.233 as finished without colour, Medusa punctulata mss —— Ocean, S. Parkinson.

NOTES: the Solander name, Medusa punctulata, seems not to have been utilized by other naturalists. The annotation in French (like others in this group of animals) is presumed to be in the hand of C.A. Lesueur, who examined the collection of drawings, probably when he visited England in 1815 on his way to North America (Goy, 1980).

267.(**3**:47) *Dactylometra* sp. Pelagiidae

DRAWING: finished water-colour; *r.* [ink] 'Medusa plicata. Sydney Parkinson pinx[t] 1769'; *v.* [pencil note indecipherable] [pencil] 'No.6 [indecipherable] Becalm'd off Terra del Foego/Lat. 54:23 Jan[ry] 12. 1769'. 240 × 297.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.110 as Medusa plicata, between Tierra del Fuego and Staten Land; (D. & W. 42) C.S.D. f.453, same data. Dryander – Catalogue f.233 as finished in colour, Medusa plicata mss —— Ocean, S. Parkinson.

NOTES: Solander's name, Medusa plicata, seems not to have been used by later naturalists. The unreadable pencil annotation appears to be a note by Lesueur.

268.(**3**:48) *Aequorea* sp. Aequoreidae

DRAWING: pencil and water-colour; four views of the animal; *r.* [ink] 'Medusa radiata/Sydney Parkinson pinx[t] ad vivum 1768'; *v.* [ink] 'off the mouth of the Harbour of Rio de Janeiro'. 238 × 294.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.112 as Medusa radiata, off Rio de Janeiro, in Atlantic, 13 April 1770 (*sic*), and New Holland 23 April 1770; (D. & W. 42) C.S.D. f.455, same data. Dryander – Catalogue f.233, as finished in colours, Medusa radiata mss —— Ocean, S. Parkinson.

NOTES: Solander's name, Medusa radiata, was not used by later naturalists, although the name was independently proposed by Tilesius (1802) from specimens collected at the mouth of the Tagus, Portugal. He made no reference to the Parkinson drawing or Solander's manuscript.

269.(**3**:49) *Aequorea* sp. Aequoreidae

DRAWING: finished water-colour; two views; *r.* [ink] 'Medusa fimbriata./Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [ink] 'off the mouth of the Harbour of Rio de Janeiro'. 268 × 370.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.113 as Medusa fimbriata, Rio de Janeiro harbour; (D. & W. 42) C.S.D. f.459 same data. Dryander – Catalogue f.233 as finished in colours, Medusa fimbriata mss —— Ocean, S. Parkinson.

NOTES: Solander's name Medusa fimbriata has not been used by later naturalists. The name was independently proposed by Dalyell (1848) but there is no evidence that he had seen either Parkinson's drawing or Solander's manuscript in naming what is evidently a different taxon. *Medusa fimbriata* is also listed by Haeckel (1879) attributed to Patrick Browne (1756) but this is not acceptable as a binominal name on account of its date.

270.(**3**:50) *Geryonia proboscidalis* (Forsskål, 1775) Geryonidae

DRAWING: finished pencil; three views; *r.* [ink] 'Medusa chrystalina./Sydney Parkinson pinx ad vivum 1768'; *v.* [ink] 'off the mouth of the Harbour of Rio Janeiro'. 240 × 297.

MANUSCRIPT: Solander (D. & W. 45) S.C. Mollusca 1, f.116 as Medusa crystallina, off Brasil; (D. & W. 42) C.S.D. f.461, same data. Dryander – Catalogue f.233 as finished without colour, Medusa crystallina mss —— Ocean, S. Parkinson.

NOTES: Solander's name Medusa crystallina appears not to have been taken up by any later naturalist.

271.(**3**:51) Unidentifiable species Order Hydroida

DRAWING: finished pencil; two views; *r.* [ink] 'Medusa limpidissima/Sydney Parkinson pinx^{t} 1769'; *v.* [pencil] 'N° 7 Medusa limpidissima/Becalmd off terra del Fuego/Lat. 54:28 Jan. 12 1769'. 235 × 295.

MANUSCRIPT: Solander (D. & W. 45) S.C. Mollusca 1, f.117 as Medusa limpidissima, Tierra del Fuego; (D. & W. 42) C.S.D. f.463, same data. Dryander – Catalogue f.233 as finished without colour, Medusa limpidissima mss —— Ocean, S. Parkinson.

NOTES: the Solander name Medusa limpidissima seems not to have been adopted by later naturalists.

272.(**3**:52) *Phialidium* sp. Campanulariidae

DRAWING: finished pencil; four views; *r.* [ink] 'Medusa obliquata./Sydney Parkinson pinx^{t} 1769'; *v.* [ink] 'off the Island of terra del Foego/Lat. 54:23. Jan. 12 1769'. 238 × 295.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.119 as Medusa obliquata, near Tierra del Fuego; (D. & W. 42) C.S.D. f.465, habitat America Australis Terram Magellanicum, Lat. 54°23′S; Dryander – Catalogue f.233 as finished without colour, Medusa obliquata mss —— Ocean, S. Parkinson.

NOTES: the Solander name Medusa obliquata seems not to have been used by later naturalists.

273.(**3**:53) *Cyanea* sp. Cyaneidae

DRAWING: finished pencil; *r.* [ink] 'Medusa pellucens./Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* 'Oct^{r}. 29. 1768/Coast of Brasil'. 374 × 268.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.120 as Medusa pellucens, off Brasil; (D. & W. 42) C.S.D. f.467, Habitat Pelago Oceani Atlantici . . . Brasilia. Dryander – Catalogue f.233 as finished without colours, Medusa pellucens mss —— Ocean, S. Parkinson.

NOTES: the name *Medusa pellucens* was published by Macartney (1810) from a communication from Joseph Banks. Sherborn's *Index Animalium* attributes it to Banks and Solander, but clearly the author of the name was Solander. It is one of the very few names to be published from Solander's extensive work on pelagic Cnidaria.

274.(**3**:54) *Pelagia noctiluca* (Forsskål, 1775) Pelagiidae

DRAWING: finished water-colour; three views of whole animal, two detailed drawings; *r.* [ink] '*Medusa pelagica*. Linn./[pencil] Sydney Parkinson pinx^{t} ad vivum 1768/[pencil] voisin de la meduse Panopyre del'atlas du voiage aux terre australia/plan. XXI au doit de la place . . . Crysaone de Peron – a Lesueur'; *v.* [ink] 'Augst. 28. 1768'. 236 × 283.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.122 as *Medusa pelagica*, Atlantic Ocean on several dates, New Zealand 23 April 1770; (D. & W. 42) C.S.D. f.471, localities and dates of capture given. Dryander – Catalogue f.233 as finished in colours, *Medusa pelagica* L. —— Ocean, S. Parkinson.

NOTES: Solander identified the specimen illustrated with *Medusa pelagica* Linnaeus, 1758, and presumably the other specimens given this name by him were in fact referable to *Pelagia noctiluca*. The annotation in French is believed to have been made by C.A. Lesueur, and the reference to planche XXI is to the unpublished plates of Peron (1807) which are referred to by number in Peron & Lesueur (1809). Pl. XXI referred to *Aequorea phosperiphora* from the coast of Arnhemland.

275.(**3**:55) Unidentified — Order Rhizostomeae

DRAWING: unfinished pencil, whole animal and detail; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'The whole animal a tawny brown (umber & egam) the spots white/the small tentaclae & the triangular ones white./[pencil] Medusa circinnata/Botany Bay'. 368 × 268.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.124 as Medusa circinnata, Sting Rays bay, New Holland; (D. & W. 42) C.S.D. f.469, same data. Dryander – Catalogue f.233 as sketch without colour, Medusa circinata mss —— N.C. (New Caledonia), S. Parkinson.

NOTES: Solander's name Medusa circinnata does not seem to have been used by later naturalists.

276.(**3**:56) *Velella velella* (Linnaeus, 1758) — Velellidae

DRAWING: finished water-colour – two views, water-colour and pencil – two views, pencil – one view; *r.* [ink] 'Phyllodoce velulla/Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [none]. 238 × 293.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.126 as Phyllodoce velella, Atlantic Ocean 7 October 1768, southern ocean several dates; (D. & W. 42) C.S.D. f.475, description and list of captures on six occasions with latitude and longitude given. Dryander – Catalogue f.231 as Phyllodoce vellella mss, finished in colours —— Ocean, S. Parkinson.

NOTES: Solander recognized these solitary floating hydroids (the By-the-wind-Sailor) as the Linnaean species *Medusa velella* but created the genus Phyllodoce to distinguish them from the other cnidarians encountered. It appears not to have been formally published.

277.(**3**:57) *Velella velella* (Linnaeus, 1758) — Velellidae

DRAWING: unfinished pencil sketches; four views; *r.* [ink] 'Phyllodoce velella'; *v.* [pencil] 'N.1. the middle inclosure wt the tentacula white w^{t} a pale cast of blue the tentacula at the edge/deep blue – the thin membrane fine blue very deep toward the edge & full of small dots./N.2 the sail quite hyaline the middle inclosures of a dirty blue mark'd w^{t} a bright/blue the outer membrane very deep blue especially at the edge'. 235 × 288.

MANUSCRIPT: Solander – see above. no.276 in this catalogue. Dryander – Catalogue no entry for sketch without colours.

NOTES: these appear to be preliminary sketches for the finished drawing listed above, see no.276.

278.(**3**:58*a*) *Beroe* sp. — Beroidae

DRAWING: finished pencil and water-colour; *r.* [ink] 'Beroe marsupium'; *v.* [none]. 126 × 238.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.134 as Beroe marsupium, Atlantic Ocean; (D. & W. 42) C.S.D. f.435 habitat in Oceano Atlanticis intra tropicus : . . var. of B. bilabiata MSS. Dryander – Catalogue f.235 as finished in colours, Beroe marsupium mss —— Ocean, S. Parkinson.

NOTES: Solander's name Beroe marsupium seems not to have been employed by later naturalists.

279.(**3**:58*b*) *Beroe* sp. Beroidae

DRAWING: finished water-colours, eight views, one pencil detail; *r.* [ink] 'Beroe labiata./Sydney Parkinson pinx^{t} ad vivum'; *v.* [ink] 'in the harbour of Rio de Janeiro'. 238 × 265.

MANUSCRIPT: Solander – no entries under B. labiata, entries under Beroe bilabiata at (D. & W. 45) S.C. Mollusca 1, f.135, Atlantic Ocean, and (D. & W. 42) C.S.D. f.431, habitat Atlantiis intra tropicos Lat. N. Sinu Oceani Atlantici ad Janeiram Brasilia. Dryander – Catalogue f.235 as finished in colours, Beroe labiata mss —— Rio Janeiro, S. Parkinson.

NOTES: the difference in name on the drawing (Beroe labiata) and in Solander's manuscripts (B. bilabiata) suggests either that Parkinson was responsible for a *lapsus calami* in labelling his drawing, or that Solander changed the name after the drawing was made. The former seems more probable.

280.(**3**:59) *Beroe* sp. Beroidae

DRAWING: finished water-colour; *r.* [ink] 'Beroe incrassata./Sydney Parkinson pinx^{t} 1769'; *v.* [ink] 'Becalmd off Terra del Foego/Lat. 54:23 Jan^{r}. 12 1769/ [indecipherable pencil note]'. 296 × 235.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.137 as Beroe incrassata, Atlantic near Tierra del Fuego; (D. & W. 42) C.S.D. f.437 same data, locality also given for Oceano Australi on October 2, 1769. Dryander – Catalogue f.235 as finished in colour Beroe incrassata mss —— Ocean, S. Parkinson.

NOTES: Solander's name Beroe incrassata does not appear to have been adopted by later authors.

281.(**3**:60*a*) *Beroe* sp. Beroidae

DRAWING: finished water-colours, one natural size, one enlarged; *r.* [ink] 'Beroe corollata/Sydney Parkinson pinx^{t} ad vivum 1768'; *v.* [pencil] 'Straw Colour/ [pencil – inked over] off the mouth of the/harbour Rio Janeiro'. 134 × 234.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f.139 as Beroe corolata, Atlantic near Brasil; (D. & W. 42) C.S.D. f.439 same data. Dryander – Catalogue f.235 as finished in colours, Beroe corollata mss —— Rio Janeiro, S. Parkinson.

NOTES: the name Beroe corolata used by Solander was not taken up by later naturalists.

282.(**3**:60*b*) *Hormiphora* sp. Pleurobrachiidae

DRAWING: finished pencil and water-colour; one natural size, two enlarged; *r.* [ink] 'Beroe coarctata./Sydney Parkinson pinx^{t} 1769'; *v.* [ink] 'South Sea Oct^{r}. 2. 1769'. 235 × 269.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f. 140 as Beroe coarctata, southern ocean 2 and 6 October, 1769; (D. & W. 42) C.S.D. f.433, localities given as Lat. 37°10′S, Long 171°5′W – 2 October 1769, and Lat. 39°12′S, Long. 174°W – 6 October 1769. Dryander – Catalogue f.235 as finished in colour; Beroe coarctata mss —— Ocean, S. Parkinson.

NOTES: Solander's name Beroe coarctata appears not to have been employed by later naturalists.

283.(**3**:61) *Callianira* sp. Callianiridae

DRAWING: finished pencil; *r.* [ink] 'Beroe biloba/Sydney Parkinson pinx^{t}. 1770'; *v.* [ink] 'South Sea April y^{e} 13th. 1770'. 296 × 234.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 1, f. 142 as Beroe biloba, southern ocean 13 April 1770; (D. & W. 42) C.S.D. f.441 same data, locality Lat. 39°27′S, Long. 204°10′W. Dryander – Catalogue f.235 as finished without colour, Beroe biloba mss —— Ocean, S. Parkinson.

NOTES: Solander's name Beroe biloba appears not to have been taken up by later naturalists.

284.(**3**:62) *Tropiometra carinata* (Lamarck, 1816) Tropiometridae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [ink] 'Rio Janeiro/ [pencil] N°2 Asterias radiata'. 372 × 265.

MANUSCRIPT: Solander – not found; Dryander – Catalogue f.237 as sketch without colour, Asterias radiata mss —— Rio Janeiro, S. Parkinson.

NOTES: Solander appears not to have described this featherstar, unless he did so for the Slip Catalogue and the sheets were lost early on. However, a number of Brazilian animals appear to have been illustrated but not described. The name Asterias radiata seems not to have been employed by later naturalists.

285.(**3**:63) *Tropiometra carinata* (Lamarck, 1816) Tropiometridae

DRAWING: unfinished pencil and water-colour; *r.* [ink] 'S. Parkinson'; *v.* [ink] 'Rio Janeiro'/[pencil] No 2 Asterias radiata'. 372 × 264.

MANUSCRIPT: see above, no.284 in this catalogue. Dryander – Catalogue f.237 as sketch with colours, Asterias radiata mss —— Rio Janeiro, S. Parkinson.

NOTES: see above, no.284 in this catalogue.

286.(**3**:64) *Culcita novaeguineae* Müller & Troschel, 1842 Oreasteridae

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'Asterias crassisoma/[ink] Otahite'. 372 × 270.

MANUSCRIPT: Solander – (D. & W. 40c) P.A.O.P. f.121 (241) as Asterias crasissima; Dryander – Catalogue f.237 as sketch without colour, Asterias crasissima mss —— Society Islands, S. Parkinson.

NOTES: the name Asterias crasissima seems not to have been adopted by later naturalists.

287.(**3**:65) *Culcita novaeguineae* Müller & Troschel, 1842 Oreasteridae

DRAWING: unfinished water-colour with pencil outline; *r.* [ink] 'S. Parkinson'; *v.* [pencil] 'Asterias crassisoma/[ink] Otahite'. 369 × 271.

MANUSCRIPT: Solander – see above, no.286 in this catalogue. Dryander – Catalogue f.237 as sketch with colours, Asterias crasissima mss —— Society Islands, S. Parkinson.

NOTES: see above, no.286 in this catalogue.

288.(**3**:66) Unidentified starfish Order Valvata

DRAWING: unfinished pencil; *r.* [ink] 'S. Parkinson/[pencil] upper side convex/ under side a little concave./the tentacula in the openings reddish orange./ Tootooreà'; *v.* [pencil] 'Asterias crassissima/[ink] Otahite'. 375 × 270.

MANUSCRIPT: Solander – see above, no.286 in this catalogue. Dryander – Catalogue f.237 as sketch without colours, see above, no.286.

NOTES: see above, n.286 in this catalogue. It is clear that there is an error in the labelling, probably of this drawing, as Solander's Asterias crassissimus refers to the sea urchin figured in drawing no.286.

289.(**3**:67) *Conchoderma auritum* (Linnaeus, 1767) Lepadidae

DRAWING: finished water-colour, two views; *r.* [ink] 'Lepas Midas./Sydney Parkinson ad vivum pinx^{t} 1768'; *v.* [pencil] 'dark purple brown [ink] Nov^{r}. 1768/ on the bottom of our/ship between the tropicks'. 239 × 291.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.241 as finished in colours, Lepas Midas mss —— Ocean, S. Parkinson.

NOTES: although Solander described other lepadomorph cirripedes, including Lepas vittata from off the bottom of the *Endeavour* in the Atlantic he apparently made no reference to Lepas midas. The name seems not to have been used by later workers.

290.(**3**:68*a*) *Conchoderma virgatum* var. *hunteri* Darwin, 1851 Lepadidae

DRAWING: finished pencil, two views; *r.* [ink] 'Lepas pelluscens./Sydney

Parkinson pinx[t] ad vivum 1768'; *v.* [ink] 'Oct[r]. 29. 1768'. 188 × 265.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 2, f.86, as Lepas pelluscens surface off Brasil; (D. & W. 42) C.S.D. f. 383 as above, habitat in Pelago Brasiliano, *Medusa pellucenti* adnatus. Dryander – Catalogue f.241 as finished without colour, Lepas pelluscens mss —— Ocean, S. Parkinson.

NOTES: Solander's name Lepas pelluscens seems not to have come into general use. The identification of this drawing should be regarded as tentative.

291.(**3**:68*b*) *Conchoderma virgatum* (Spengler, 1790) Lepadidae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Lepas vittata/[pencil] A. Buchan Pinx[t] 1768'; *v.* [ink] 'Nov[r]. 1768/[pencil] Lepas vittata/[ink] on the bottom of our ship'. 170 × 264.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 2, f.88 as Lepas vittata, on the *Endeavour* between the Canaries and Brasil; (D. & W. 42) C.S.D., same data. Dryander – Catalogue f.241 as finished in colour, Lepas vittata mss —— Ocean, A. Buchan.

NOTES: Solander's name Lepas vittatus was not listed by Darwin (1851) but according to Sherborn (*Index Animalium*) was used; he attributed it to Solander (1786) in the *Catalogue* of the Portland collection.

292.(**3**:69) *Lima lima* (Linnaeus, 1758) Limidae

DRAWING: finished water-colour; *r.* [pencil] 'Ostrea Limanda/Sydney Parkinson pinx[t] ad vivum 1768'; *v.* [ink] 'Brasil'. 236 × 288.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.241 as finished in colours, Ostrea limanda mss —— Brasil, S. Parkinson.

NOTES: it appears that no description of Ostrea limanda was made by Solander. This is yet another example of an animal from Brazilian waters which was drawn but not described.

293.(**3**:70) *Lima lima* (Linnaeus, 1758) Limidae

DRAWING: unfinished water-colour; two views; *r.* [ink] 'Ostrea limanda Linn.'; *v.* [pencil] 'Ostrea/limanda B.'. 237 × 286.

MANUSCRIPT: Solander – see above, no.292 in this catalogue. Dryander – Catalogue f.241.

NOTES: as Dryander listed only the one drawing and that as finished in colours, this drawing would seem not to have been listed. The attribution of *Ostrea limanda* to Linnaeus is probably a *lapsus calami* for *Ostrea lima* Linnaeus, 1758. See also no.292 in this catalogue.

294.(**3**:71*a*) *Janthina janthina* (Linnaeus, 1758) Janthinidae

DRAWING: finished water-colour by A. Buchan; two views; *r.* [ink] 'Helix violacea/ [pencil] Buchan del'; *v.* [ink] 'Oct^r. 7^th. 1768/[pencil] Helix violacea'. 180 × 266.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 14, f.17 as Helix violacea, Atlantic Ocean between the tropics; (D. & W. 42) C.S.D. f.415 same data, also note on observations on species similar in Oceano Australi. Dryander – Catalogue f.243 as finished in colours, Helix violacea L. —— Ocean, A. Buchan.

NOTES: the name Helix violacea does not appear to have been taken up by later authors. No such species was included by Linnaeus despite Dryander's attribution.

295.(**3**:71*b*) *Janthina janthina* (Linnaeus, 1758) Janthinidae

DRAWING: finished water-colour by A. Buchan; *r.* [ink] 'Helix violacea./[pencil] Buchan del.'; *v.* [ink] 'Oct^r. 7^th. 1768 [this overlying pencil] Helix violacea'. 180 × 266.

MANUSCRIPT: Solander – see above, no.294 in this catalogue. Dryander – Catalogue f.243 as finished in colour. Helix violacea —— Ocean, A. Buchan.

NOTES: see above, no.294 in this catalogue.

296.(**3**:72*a*) *Janthina ?globosa* Swainson, 1822 Janthinidae

DRAWING: finished water-colour by A. Buchan; two views; *r.* [ink] 'Helix Janthina/[pencil] Buchan del'; *v.* [ink] 'Oct^r. 7^th. 1768 [overlying pencil]'. 185 × 203.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 14, f.19 as *Helix janthina*; (D. & W. 42) C.S.D. f.417 references to Linnaeus and figure. Dryander – Catalogue f.243 as finished in colour, *Helix janthina* L. —— Ocean, A. Buchan.

NOTES: this purple sea snail was referred by Solander to *Helix janthina* Linnaeus, 1758, then the only species of the group recognized.

297.(**3**:72*b*) *Leptaxis* sp. Helicidae

DRAWING: finished water-colour by A. Buchan; two views; *r.* [pencil] 'Buchan del.'; *v.* [ink] 'Madera'. 178 × 264.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.243 as finished in colour, Helix —— Madeira, A. Buchan.

NOTES: as this drawing is not named it is impossible to reconcile it with any species named by Solander. However, there are no species of Madeiran *Helix* named in the manuscripts and it appears that Solander did not describe it.

298.(**3**:73) *Scutus breviculus* (Blainville, 1817) Fissurellidae

DRAWING: finished water-colour; two views; *r.* [pencil] 'Patella/[ink] S.

Parkinson del'; *v.* [ink] 'Motuaro'. 267 × 372.

MANUSCRIPT: Solander – not found. Dryander – Catalogue f.245 as finished in colour, *Patella* —— New Zealand, S. Parkinson.

NOTES: there is no trace of a *Patella* from New Zealand in the Solander manuscripts, and Wilkins (1955) found only eight New Zealand shells in the Banksian shell collection none of which was this species.

299.(**3**:74) Unidentified sea cucumber — Class Holothuroidea

DRAWING: unfinished pencil sketch; *r.* [ink] 'Parkinson del'; *v.* [pencil] 'Alcyonium anguillare/[ink] off the Island of Terra del Foejo/Lat. 54:23. Jan^{ry}. 12 1769'. 262 × 379.

MANUSCRIPT: Solander – (D. & W. 45) S.C. Mollusca 14, f.62 as Alcyonium anguillare, Atlantic Ocean near Tierra del Fuego; (D. & W. 42) C.S.D. f.479 same data 'serpente marino a nauticis'. Dryander – Catalogue f.249 as sketch without colours, Alcyonium —— Ocean, S. Parkinson.

NOTES: Solander's manuscript name Alcyonium anguillare seems not to have been employed by later naturalists. His reference to the name used by the *Endeavour*'s sailors suggests why he employed the trivial epithet.

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The order of this listing follows the *Synopsis and classification of living organisms* (Parker, 1982). It includes only the modern nomenclature used in the Catalogue, systematically arranged to family, thence alphabetically, relating the entry to the *Catalogue number*, not page number. A general index follows the Systematic index.

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Bulletin of the British Museum (Natural History)

Darwin's Insects

Charles Darwin's Entomological Notes

Kenneth G. V. Smith (Editor)

Historical series Vol 14 No 1 24 September 1987

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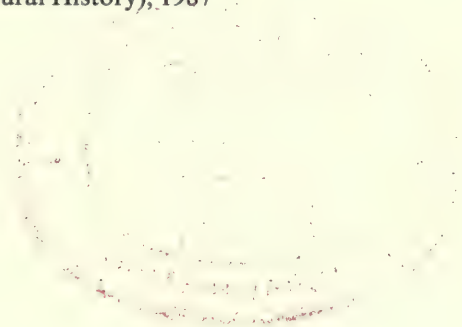

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Darwin's Insects

Charles Darwin's Entomological Notes,
with an introduction and comments by

Kenneth G. V. Smith

Department of Entomology
British Museum (Natural History), London SW7 5BD

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Issued 24 September 1987

To
Richard Broke Freeman
(1915–1986)

'No branch of natural science
has more fully felt the
beneficial impulse and
stimulus of Darwin's labors
than entomology'
C. V. Riley, 1883

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Synopsis

The insects collected by Charles Darwin, both on the *Beagle* voyage and in the United Kingdom, are discussed and their present location indicated. Comments are made on these specimens within the framework of Darwin's entomological notes preserved in London (*Insect Notes*) and in Cambridge (*Insects in Spirits of Wine*) published here for the first time. These comments include identification of the insects with published descriptions to date and also present new information on unrecorded material, including new records for the Galapagos Islands and South America. There is some discussion of more general topics including the possibility of insect transmitted Chagas' disease as a cause of Darwin's ill health (see *Insect Notes*, 2913, 3423). A full list of entomological eponyms formed from Darwin's name is given, along with an extensive bibliography.

Introduction

Charles Darwin's interest in entomology began in childhood. In his autobiographical notes (see Darwin, F., 1887, Vol. 1: 34) he wrote:

> I must have observed insects with some little care, for when ten years old (1819) I went for three weeks to Plas Edwards on the sea coast in Wales, I was very much interested and surprised at seeing a large black and scarlet Hemipterous insect, many moths (Zygaena), and a Cicindela which are not found in Shropshire. I almost made up my mind to begin collecting all the insects which I could find dead, for on consulting my sister I concluded that it was not right to kill insects for the sake of making a collection.

Elsewhere (p. 51) in the autobiography however he says:

> I was introduced to entomology by my second cousin, W. Darwin Fox, a clever and most pleasant man, who was then at Christ's College. . .

Darwin spent much of his spare time at Cambridge (1828–31) collecting beetles with William Fox, Leonard Jenyns, Albert Way and H. Thompson.[1] He would also press others into service of 'the science' as he called it so that John Herbert[2] recalled (Darwin, F., 1887, Vol. 1: 168):

> and very soon he armed me with a bottle of alcohol, in which I had to drop any beetle which struck me as not of a common kind.

His summer vacations were given up to 'collecting beetles, to some reading, and short tours'. He visited the Reverend F.W. Hope[3] who was later to establish the Chair of Entomology at Oxford with J.O. Westwood[4] as the first Hope Professor. Hope had a high opinion of Darwin's entomological ability and in July 1829 the two men went on a collecting trip in North Wales.

Darwin's most important contact at Cambridge was Professor J.S. Henslow[5] who not only broadened his whole approach to natural history, including entomology, but was instrumental in securing his appointment as naturalist on the *Beagle* voyage.

While entomology was not the major preoccupation of the *Beagle* voyage some of the captures and observations were important and played their part in the formulation of his later theories (in contrast to his well-known comment to Lyell in 1863 (Darwin, F., 1887, Vol. 3: 69) that 'entomolo*gists* are enough to keep the subject back for half a century'—my italics).

Darwin's contributions to entomology have been briefly assessed by Riley (1883), Poulton (1901), Carpenter (1935, 1936) and Remington & Remington (1961). Freeman (1977) provides a bibliography to Darwin's publications in book form and Barrett (1977) reprints Darwin's contributions to serial publications. Kritsky (1981) gives a brief survey of Darwin's entomological work and includes a useful index to more than 1600 text references to insects contained in Darwin's published works, though mostly in American editions.

The present work indicates the sources of information of Darwin's contributions to entomology and attempts to locate and comment upon the insect specimens collected by Charles Darwin especially during the voyage of the *Beagle*. The *Beagle* material is identified within the framework of Darwin's entomological notes preserved in the British Museum (Natural History) (*Insect Notes*), at the University of Cambridge (*Insects in Spirits of Wine*) and at Down House (the original *Notebooks*). The *Zoological Diary*, preserved in the University of Cambridge, also contains

entomological notes which are quoted where they are cited in the *Insect Notes* and not already published in the *Journal* (Darwin, C., 1845).

Information (see Notes, p. 113) is also given on entomologists and others who collected insect specimens for Darwin or were otherwise involved in his entomological work.

Darwin's British Insects

Darwin was a fanatical beetle collector and in his *Autobiography* (Darwin, F., 1887; Vol. 1: 50) he says:

> But no pursuit at Cambridge was followed with nearly so much eagerness or gave me so much pleasure as collecting beetles. It was the mere passion for collecting; for I did not dissect them, and rarely compared their external characters with published descriptions, but got them named anyhow. I will give a proof of my zeal: one day, on tearing off some old bark, I saw two rare beetles, and seized one in each hand; then I saw a third and new kind, which I could not bear to lose, so that I popped the one which I held in my right hand into my mouth. Alas! it ejected some intensely acrid fluid, which burnt my tongue so that I was forced to spit the beetle out, which was lost, as was the third one.

He was always searching for new collecting methods and was very proud when his first records appeared in print and goes on to say:

> I was very successful in collecting and inventing two new methods; I employed a labourer to scrape during the winter, moss off old trees and place it in a large bag, and likewise to collect the rubbish at the bottom of the barges in which reeds are brought from the fens, and thus I got some very rare species. No poet ever felt more delighted at seeing his first poem published than I did at seeing, in Stephen's 'Illustrations of British Insects', the magic words "captured by C. Darwin, Esq.".

In Stephens, *Illustrations of British Entomology* (1827–45) the following records (given in quotes by Stephens) are attributed to 'C. Darwin Esq.'. There are several references to these records in the literature but they do not appear to have been listed before. Since in effect they constitute Darwin's first publication (Freeman, 1977: 19) they are listed here with Darwin's original data in large type and (where necessary) equivalent modern nomenclature and comments set below in small type.

Mandibulata vol. 2 (Appendix) (15 June 1829)

[Coleoptera] Carabidae

p. 188. *Ocys tempestivus* Panzer 'Cambridge'
[*Trechus quadristriatus* (Schrank)]. Common in dry open country.

p. 191. *Blethisa multipunctata* L. 'In great abundance near Cambridge in 1829'
A widely distributed but local species usually in open marshy places at the edges of ponds. It is recorded from the Cambridgeshire Fens (Donisthorpe, 1904).

[Col. Haliplidae]

p. 191. *Haliplus elevatus* Panzer 'Near Cambridge, 1829'
[*Brychius elevatus* Panzer)]. Common (less so in the north) in running water.

[Col. Dytiscidae]

p. 191. *Hygrotus scitulus* Spence ms., 'Near Cambridge'
[*Hydroporus lepidus* Olivier]. Widespread in any kind of clear water.

p. 192. *Hydroporus areolatus* Duftschmid 'Cambridge'.
[*Scarodytes halensis* (Fabricius)]. South-east and Eastern England in gravel pits, marsh drains etc.

p. 194. *Colymbetes pulverosus* Stephens 'In profusion near Cambridge'
[*Rhantus suturalis* (Macleay)]. Common in Southern Britain; usually in stagnant or slow-flowing water such as canals.

p. 194. *Colymbetes notatus* F. 'In abundance near Cambridge'
[*Rhantus frontalis* (Marsham)]. Scattered distribution in England and Ireland; in fresh and peaty water pools.

p. 194. *Colymbetes exoletus* Forster. 'Abundantly near Cambridge'
[*Rhantus exsoletus* (Forster)]. Common in England, Scotland and Ireland.

p. 194. *Colymbetes agilis* F. 'In profusion near Cambridge in 1829'
[Transferred by Stephens (1829 appendix p. 194) to *adspersus* F. but referable to *Rhantus bistriatus* Bergstrasser (Balfour-Browne, 1950: 237)]. Commoner in the north than in the south and a coastal species in Ireland; mainly in acid water.

p. 194. *Colymbetes adspersus* F. 'Plentiful near Cambridge in 1829'
[May be *Rhantus aberratus* Gemminger & Van Harold but see previous entry]. The true *adspersus* F. was known as a fen species in East Anglia up to 1829, then it disappeared until one specimen was found in 1904.

p. 195. *Hydaticus hybneri* F. 'Near Cambridge, 1829'
[*Hydaticus seminiger* (Degeer)]. Scattered distribution in England as far north as Yorkshire, mostly in fens in the east of England.

p. 195. *Dytiscus (Leionotus) conformis* Kuntze 'Near Cambridge, not rare, 1829'
[*Dytiscus marginalis* L.]. For discussion of Kirby's genus *Leionotus* and Stephens' acceptance of it see Balfour-Browne, 1950: 266, 271 (see also *Insect Notes,* entries 1324, 1325). Common in stagnant water.

Mandibulata vol. 3 (1830)

[Col., Leiodidae]

p. 7. *Ptomaphagus anisotomoides* Spence 'Shropshire'
[*Nargus anisotomoides* (Spence)]. Found among dead leaves, moss, etc.

p. 7. *Ptomaphagus wilkinii* Spence 'Salop'
[*Nargus wilkini* (Spence)]. Found among dead leaves, moss, etc.

p. 9. *Catops sericeus* Paykull 'Cambridge and Salop'
[*Ptomaphagus medius* Rey]. Found among dead leaves, moss and small carcasses.

p. 14. *Choleva angustata* F. 'North Wales'
[*Choleva angustata* (Fabricius)]. Found in plant refuse generally. Fairly common, though local, among dead leaves, moss, etc.

p. 14. *Choleva agilis* Illiger 'North Wales'
[*Choleva agilis* (Illiger)]. Fairly common among dead leaves, etc., especially in the south of England.

[Col., Silphidae]

p. 19. *Necrophorus interruptus* Stephens 'Found with the preceeding [vestigator] but occurs much less frequently.' This record 'Rev. L. Jenyns and C. Darwin Esq.'
[*Nicrophorus*]. Uncommon, southern counties of England in carcasses.

[Col., Nitidulidae]

p. 33. *Nitidula punctatissima* Illiger 'Shropshire'
[*Soronia punctatissima* (Illiger)]. A rare species found at sap in or near larval burrows of the goat moth.

p. 38. *Nitidula obsoleta* Illiger 'Cambridgeshire and North Wales'
[*Epuraea biguttata* (Thunberg)]. This genus is found at sap, under bark and in fungi.

p. 41. *Nitidula limbata* F. 'North Wales'
[*Epuraea limbata* (Fabricius)]. See previous species.

[Col., Cryptophagidae]

p. 79. *Cryptophagus typhae* Gyll. 'Cambridgeshire and North Wales'
[*Telmatophilus typhae* (Fallén)]. Beetles of this genus are found on *Typha* and other water plants.

[Col., Silvanidae]

p. 104. *Crypta bipunctata* F. 'Near Cambridge'
[*Psammoecus bipunctatus* (Fabricius)]. Local but not uncommon in marshy places in the south on reeds and rushes and in litter beneath.

[Col., Histeridae]

p. 154. *Hister quadristriatus* Paykull 'Barmouth' 'Rev F. W. Hope and C. Darwin, Esq.'
[*Hypocaccus rugiceps* (Duftschmid)]. Rare, in dung and carrion on sand-hills near the coast.

[Col., Geotrupidae]

p. 182. *Geotrupes laevis* Haw. 'Barmouth and North Wales' 'Rev F. W. Hope and C. Darwin, Esq.'
[*Geotrupes vernalis* L.]. Local, though of wide distribution. Occurs in decaying fungi.

[Col., Buprestidae]

p. 242. *Trachys pygmaea* F. 'Cambridge'
[*Trachys troglodytes* Gyllenhall]. Widespread in damp, grassy places and sphagnum bogs; can be swept from *Succisa pratensis* Moench, the larval host-plant and hibernates as an adult in *Sphagnum* moss.

[Col., Elateridae]

p. 266. *Ctenicerus cupreus* F. Stephens says:
females generally rare; at least fifty males to one female having usually occurred; but in August, 1829, out of scores of specimens now under my inspection captured by the Rev F. W. Hope and C. Darwin, Esq., in North Wales, scarcely a single male was observed.
[*Ctenicera cuprea* (Fabricius)]. A species with a generally northern distribution.

p. 278. *Campylus linearis* L. 'Woods near Cambridge'
[*Denticollis linearis* (L.)]. Fairly widely distributed but local; a woodland species.

Mandibulata vol. 4 (1831)

[Col., Curculionidae]

p. 117. *Otiorhynchus atroapterus* Degeer 'Barmouth' 'Rev F. W. Hope and C. Darwin, Esq.'
[*Otiorhynchus atroapterus* (Degeer)]. Local in sandy places on coast among grass, etc.

[Col., Chrysomelidae]

p. 274. *Donacia nigra* F. 'Near Cambridge'
[*Donacia braccata* Scopoli]. Local in the south and East Anglia, usually near the coast.

Haustellata vol. 2 (appendix) (1 June 1829).

[Lep., Noctuidae]

p. 200. *Graphiphora plecta* L. 'Cambridge'
[*Ochropleura plecta* (Linnaeus)]. The flame shoulder moth. Common and generally distributed throughout England, Ireland and the mainland of Scotland.

The Stephens collection is in the British Museum (Natural History) (see Hammond, 1972) but contains no Darwin specimens and only a few have been found in Cambridge. Darwin's records were later repeated without his name appended (Stephens, 1839).

There are comments on Darwin's collecting of beetles in Cambridgeshire in *The natural history of Wicken Fen* (Gardiner & Tansley, 1923–32). In that work Omer Cooper, Perkins & Tottenham record that:

> Darwin gave many records and specimens to Babington Jenyns, and Stephens, whose publication of them in his 'Illustrations' afforded him much gratification.

Of Babington they say:

> amassed a remarkably fine collection, but the localities are loosely recorded; in his collection, which is preserved in the University Museum, are specimens collected by Charles Darwin.

Of Jenyns, an intimate friend of Darwin's, they say:

> His collection of insects with an excellent manuscript of localities was presented to the Cambridge Philosophical Society in 1865, when he removed from the district.

They list 14 species of Carabidae collected by Darwin (*teste* Jenyns) and these are included in an assessment of the decline of certain species and the increase of others in Wicken Fen since 1834. The full list of Darwin species follows in alphabetical order of genera with modern equivalent nomenclature given in brackets where necessary: *Acupalpus luridus* Dejean (= *A. flavicollis* Sturm), *Amara lucidae* (Duft.), *A. plebeia* (Gyll.), *Auchomenus atratus* Duft. (= *Agonum nigrum* Dej.), *Bembidion adustum* Schaum. (= *B. semipunctatum* Donovan), *Chlaenius nigricornis* F., *Harpalus puncticollis* (Payk.), *H. punctatulus* (Duft.), *H. rubripes* (Duft.), *Pterostichus inaequalis* Mshm (= *P. longicollis* Duft.), *P. picimanus* (Duft.) (= *P. macer* Mshm), *Stenolophus teutonus* (Schrank), *S. vespertinus* Panz. (= *S. mixtus* Herbst.). They also list *Elaphrus uliginosus* F. as *teste* Stephens, though this does not appear in Stephens' *Illustrations of British Entomology*.

Another very rare carabid capture of Darwin's (though not mentioned by Omer Cooper *et al.*) is that of *Chlaenius tristis* Scheller (as *C. holosericeus* F.). Donisthorpe (1904) records that Darwin found this species near Cambridge. Lindroth (1974) says of it:

> on lake-shores with clayish soil and rich vegetation; often associated with *Blethisa*.— England: Huntingdon, Cambridge. Wales (doubtful). Ireland. Only old records, possibly extinct.

References to other captures of British beetles are made in the *Life and Letters* (Darwin, F., 1887, Vol. 1: 51) including the very local *Panagaeus cruxmajor* (L.) (Carabidae) which Darwin captured in Cambridge. Donisthorpe (1904) says it occurs sparingly at Wicken and other fens under sedge refuse and Lindroth (1974), whom I have followed for most of my comments on Carabidae, notes it as a local species in England up to Yorkshire and from Glamorgan and Ireland.

Francis Darwin (1887, Vol. 2: 140) also records how his father 'revived old knowledge of beetles' in helping his boys in their collecting. He sent a short notice to the *Entomologist's Weekly Intelligencer* 25 June 1859, recording the capture of *Licinus silphoides* [= *Licinus punctatulus* F., Carabidae], *Clytus mysticus* [= *Anaglyptus mysticus* L., Cerambycidae] and *Panagaeus 4-pustulatus* [= *P. bipustulatus* F., Carabidae]. The notice begins with the words 'We are three very young collectors having lately taken in the Parish of Down, &C.', and is signed by three of his boys, but was clearly not written by them (see Darwin, Darwin & Darwin, 1859). The species concerned are all rather local and uncommon.

On the same page of the *Life and Letters,* in a letter to W.D. Fox, 13 November 1858, Darwin mentions captures of *'Brachinus crepitans'* (Carabidae) and *'Licinus'* (Carabidae) by his third boy [Francis].

The two separate storeboxes of beetles, one at Down House (Figs 7–8) and one at Cambridge (Figs 5–6), are commented on in the appropriate sections, but it can be assumed that some of his other British beetles are scattered throughout the British collection at the Cambridge University Museum of Zoology. Some Darwin specimens 'ex coll. Jenyns' have been traced in the collection but none of those listed in Babington's notebook.

Between the years 1854 and 1861 Darwin was helped by five or six of his children in observations on the flight routes of male humble-bees (*Bombus hortorum* L., *B. pratorom* L. and *B. lycorum* L). These were never written up for publication in England though a précis was published in Germany along with some of his shorter works by Ernst Krause (see Darwin, C., 1885–86). The original notes have since been published (in English) by Freeman (1968).

In 1980 Richard Treadwell brought into the British Museum (Natural History) a box of microscopical preparations on slides which he claimed had once belonged to Charles Darwin. The box of slides was given to Mr Treadwell by a Miss Dorothea Flower who lived with his great-aunt Mrs Emmerson. Miss Flower told Mr Treadwell that the collection had belonged to Darwin and that 'some were prepared by Charles Darwin'. The slides were mostly typical professionally prepared Victorian slides largely of insect parts, some labelled 'Stanley. Optician, Railway Approach, London Bridge'. Some slides however were obviously 'amateur' preparations. Two of mites bore handwritten labels 'Acari from a partridge' and 'Acarus vegetans'. Photocopies of the labels were sent to P.J. Gautrey and his colleagues at Cambridge who concluded that the handwriting did not match that of Darwin or Syms Covington (his assistant), or Fletcher or Norman, two schoolmasters at Downe who transcribed for Darwin.

Miss Flower died about 1970 having lived at Hurtwood Cottage, Holmbury St Mary, near Dorking since before the Second World War. The house had been owned by her father. He had been a judge and had retired to live in Holmbury just before the war and died sometime between 1940 and 1946. Before moving to Holmbury the family lived in London. I have been unable to trace any connection with Sir William Henry Flower, sometime Director of the British Museum (Natural History) and a friend of Darwin's and the precise history of these slides must remain untold though there is no reason to doubt Mr Treadwell's story.

Mention of British (and other) insects in Darwin's published writings are listed in Kritsky (1981) and his shorter contributions to the serial literature are reprinted in full by Barrett (1977).

Entomology on the *Beagle* voyage

On the *Beagle* voyage entomology took its place with the collection of other animals and plants and all were secondary to geology. Darwin was particularly interested in collecting the smaller, less known, species of insects and wrote to Henslow from Rio de Janeiro on 18 May 1832 (see Barlow, 1967: 55)

> I am now collecting fresh-water & land animals: if what was told me in London is true viz that there are no small insects in the collections from the Tropics.—I tell Entomologists to look out & have their pens ready for describing.—I have taken as minute (if not more so) as in England, Hydropori, Hygroti, Hydrobii, Pselaphi, Staphylini, Curculio, Bembididous insects etc etc.—It is exceedingly interesting observing the difference of genera & species from those which I know, it is however much less than I expected.

Later he wrote again to Henslow from Valparaiso in March 1835 (see Barlow, 1967: 101):

> In Zoology I have done but very little; excepting a large collection of minute Diptera & Hymenoptera from Chiloe. I took in one day, Pselaphus, Anaspis, Latridius [*sic*], Leiodes, Cercyon & Elmis & two beautiful true Carabi; I might almost have fancied myself collecting in England.

Collecting methods

Most of the collecting was almost certainly done by Darwin and his servant Syms Covington[6] (Fig. 1) together. It was Captain FitzRoy's[7] rule that no one went ashore alone and since Covington was in Darwin's pay he was virtually with him at all times (though rarely mentioned by name, see *Journal* (Darwin, 1845: 52)) without inconvenience to the ship's company. It is probable that some of the collections were made entirely by Syms Covington especially towards the end of the voyage, though only once is this evident from the *Insect Notes* (see entry 3528). Darwin also went ashore with other members of the ship's company, not always collecting (see Barlow, 1933) though the acting surgeon Benjamin Bynoe[8] also made collections of plants and birds.

Sweeping with a net was probably the commonest method of collecting terrestrial insects and a special water net was employed for aquatic species (see *Insect Notes* entry 529). Larger, more robust, terrestrial insects were probably caught individually with 'fly-nippers' (see comments in *Insect Notes* entry 3). Advantage was taken of natural 'baits' especially dung, carrion, fungi, flowers and even the contents of spiders' webs (see *Insect Notes* entry 456). Many of his earlier methods of collecting such as bark stripping and moss-combing are also evident from entries in the *Insect Notes*. Specimens were also collected in pill-boxes or straight into alcohol (spirits of wine) and some of the more delicate insects such as Diptera were evidently pinned into store-boxes as is suggested in a letter to Henslow (Monte Video, 15 August 1832—see Barlow, 1967: 58):

> —Also a good many small beetles in pill boxes: but it is not the best time of year for the latter.—As I have only 3/4 of a case of Diptera etc. I have not sent them.

Return and disposal of collections

During the voyage specimens were sent back to Henslow at Cambridge who had agreed to distribute the specimens to appropriate specialists. The following extract from Darwin's letters to

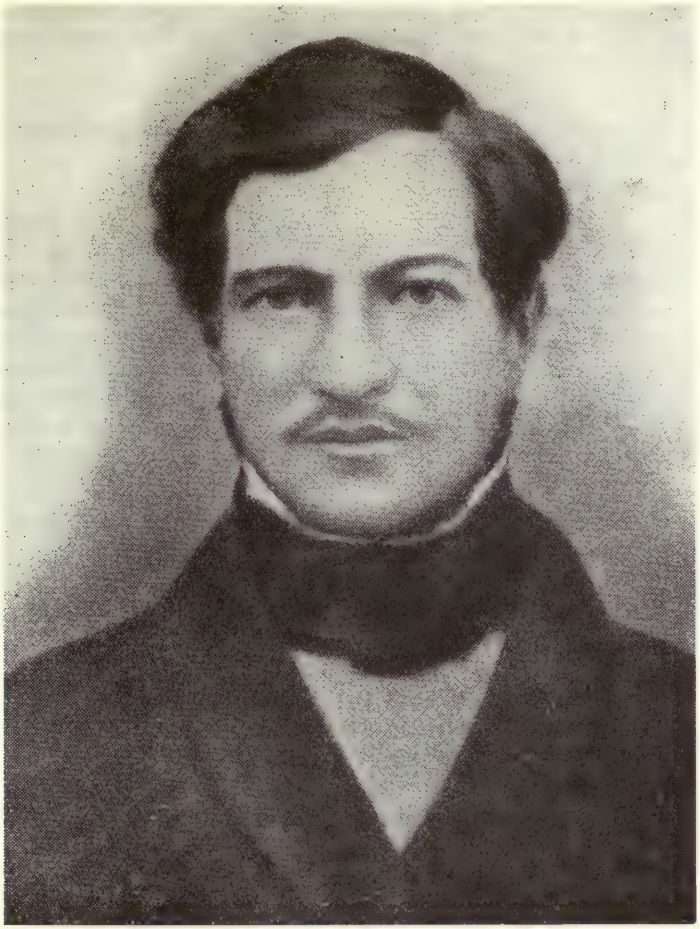


Fig. 1 Syms Covington (photograph by courtesy of Mr Brian Sirl).

Henslow (see Barlow, 1967) illustrate how this was effected and some of the considerations involved:

Rio de Janeiro, 16 June 1832 [In letter started 18 May]
I have determined not to send a box till we arrive at Monte Video—it is too great a loss of time both for carpenter and myself to pack up whilst in harbour.

Monte Video, 15 August 1832
I have sent home 4 bottles of animals in spirits I have three more, but would not send them till I had a fourth.—I shall be anxious to know how they fare—

E. Falkland Isd., March 1834
I have forgotten to mention, that for some time past and for the future, I will put a pencil cross on the pill boxes containing insects, as these alone will require being kept particularly dry, it may perhaps save you some trouble.

Valparaiso, March 1835
I shall be obliged to send away one more box; this will be the last, with which I shall trouble you. I am afraid so many boxes must have been very much in your way. I trust they may

> turn out worth their storage. I will write again when this last cargo is sent. You ought to have received about a month since 2 boxes sent by H.M.S. Challenger & before that 2 casks & one jar by H.M.S. Samarang.

On his return to England Darwin was faced with the problem of getting his material identified and wrote to Henslow (Barlow, 1967: 119):

> London, 30 October 1836
> . . . I have scarcely met anyone who seems to wish to possess any of my specimens. . . . I see it is quite unreasonable to hope for a minute, that any man will undertake the examination of a whole order.—It is clear the collectors so much outnumber the real naturalists, that the latter have no time to spare.—I do not even find that the collections care for receiving the unnamed specimens.—The Zoological Museum [of the Zoological Society] is nearly full & upward of a thousand specimens remain unmounted. I daresay the British Museum would receive them but I cannot feel, from all that I hear, any great respect even for the present state of that establishment.

He goes on to suggest that he stays in Cambridge where he would expect more help than in London and says:

> Of the Naturalists F. Hope is out of London, Westwood I have not seen; so about my insects I know nothing.

Then, as now, competent taxonomists were too few and their work-load consequently too great to be able to cope quickly with large expedition collections. Thus, as with Captain Cook's and other famous expeditions, much of Darwin's material became dispersed among available and willing specialists. Darwin was more fortunate than most and the birds, mammals (including fossils), reptiles and fish received excellent treatment in the sumptuous *Zoology* (Darwin, 1838–43). The insects from the *Beagle* voyage have received considerable attention as the rest of this paper will show.

In the *Centenary History of the Entomological Society of London* (Neave *et al.*, 1933: 68–9) it is stated:

> Hope announced his intention at the General Meeting on 5th July, 1841, to present his entire collection of British Crustacea to the Society. The next month saw the presentation by Darwin of the insects collected on the voyage of the *Beagle*, and it appears that on his return from his famous voyage, Darwin was much exercised in his mind as to the disposal of his collections. For some reason he was not anxious to present them to the National Collection at the British Museum, and portions of them were presented to this Society, and, as may be seen from the Centenary History of the Zoological Society of London, others were handed over to that body. As is well known, however, the more valuable portions of both these collections eventually reached the British Museum.

However, in the *Centenary History of the Zoological Society of London* (Mitchell, 1929: 104) it is recorded that Darwin decided against giving his specimens to the Museum of the Zoological Society.

Not all of Darwin's material reached the British Museum and some of the specimens that did were again dispersed to other specialists so that collections have been located in Cambridge, Oxford, Dublin and elsewhere. Material in the British Museum is considered first.

The localities in which insects were collected on the *Beagle* voyage are shown on the maps (Figs 2–4, 19) and an itinerary of the voyage is given here since this is not easily interpreted from the *Insect Notes*.

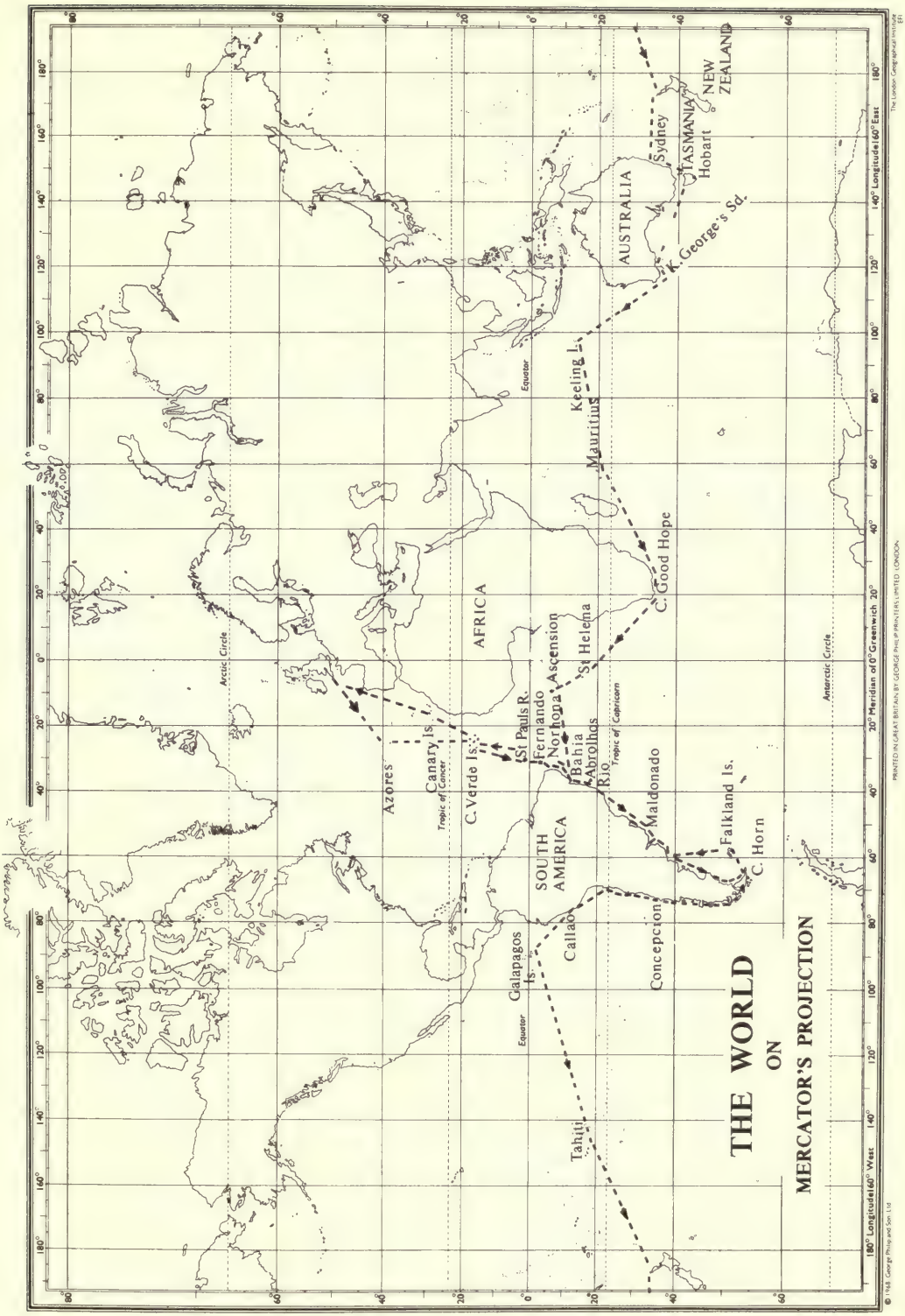


Fig. 2 Simplified route of the voyage of the *Beagle*.

Fig. 3 South America showing the localities mentioned in the *Insect Notes*.

Fig. 4 Tierra del Fuego showing localities mentioned in the *Insect Notes* and other items of Darwin interest.

Itinerary of the voyage of H.M.S. Beagle from Dec. 27, 1831 to Oct. 2, 1836
(After Barlow, 1967)

Left	Arrived	At sea	On land
Devonport, Dec. 27, 1831	Cape Verde Is., Jan. 18, 1832	21 days	21 days
C. Verde Is., Feb. 8, 1832	Bahia, Brazil, Feb. 28	20 days	19 days
Bahia, Brazil, Mar. 18	Rio de Janeiro, Apr. 5	18 days	91 days
Rio de Janeiro, Jul. 5	Monte Video, Jul. 26	21 days	24 days
Monte Video, Aug. 19	Bahia Blanca, Sept. 6	18 days	41 days
Bahia Blanca, Oct. 17	Monte Video, Nov. 2	16 days	24 days
Monte Video, Nov. 26	T. del Fuego, Dec. 16, 1832	20 days	72 days
T. del Fuego, Feb. 26, 1833	Falkland Is., Mar. 1	3 days	35 days
Falkland Is., Apr. 6	Maldonado (near Monte Video), Apr. 28	22 days	86 days
Maldonado, Jul. 23	Rio Negro, Aug. 3	11 days	122 days
Monte Video, Dec. 6	Port Desire, Dec. 23, 1833	17 days	12 days
Port Desire, Jan. 4, 1834	Port St Julien (110 miles south), Jan. 9	5 days	10 days
Port St Julien Jan. 19	Str. of Magellan (via Falkland Is.), Jan. 29	10 days	9 days
Str. of Magellan Mar. 7	Falkland Is., Mar. 10	3 days	28 days
Falkland Is., Apr. 7	Santa Cruz River, Apr. 13	6 days	29 days
Santa Cruz, May 12	Chiloe, Jun 28 (many landings in Straits)	47 days	15 days
Chiloe, Jul. 13	Valparaiso, Jul. 31	18 days	102 days
Valparaiso, Nov. 10 (Illness)	Chiloe, Nov. 21 1834	11 days	106 days
Chiloe, Feb. 4, 1835	Valdivia, Feb. 8	4 days	14 days
Valdivia, Feb. 22	Concepcion, Mar. 4 (Earthquake)	10 days	3 days
Concepcion, Mar. 7	Valparaiso, Mar. 11 (S. Jago)	4 days	117 days
Copiapò, Jul. 6	Iquiqui, Jul. 12	6 days	3 days

Left	Arrived	At sea	On land
Iquiqui, Jul. 15	Gallao, for Lima, Jul. 19	4 days	50 days
Gallao, Sept. 7	Galapagos, Sept. 16	9 days	34 days
Galapagos, Oct. 20	Tahiti, Nov. 15	26 days	11 days
Tahiti, Nov. 26	New Zealand, (Bay of Islands) Dec. 21	26 days	9 days
New Zealand, Dec. 30, 1835	Sydney, Jan. 12, 1836	13 days	18 days
Sydney, Jan. 30	Hobart, Tasmania, Feb. 2	3 days	15 days
Hobart, Feb. 17	St George's Sound, Australia, Mar. 3	14 days	11 days
St George's Sound, Mar. 14	Keeling I., Apr. 2	19 days	10 days
Keeling I., Apr. 12	Mauritius, Apr. 29	17 days	11 days
Mauritius, May 9	C. of Good Hope, May 31	22 days	18 days
C. of Good Hope, Jun. 18	St Helena, Jul. 7	19 days	7 days
St Helena, Jul. 14	Ascension, Jul. 19	5 days	4 days
Ascension, Jul. 23	Bahia, Brazil, Aug. 1	9 days	5 days
Bahia, Brazil, Aug. 6	Pernambuco, Aug. 12	6 days	5 days
Pernambuco, Aug. 17	Porto Praya, C. Verde Is., Sept. 4	18 days	16 days
Terceira, Azores, Sept. 20	Falmouth, Oct. 2, 1836	12 days	—

Paradiz (1981) treats the South American journeys in detail and gives clear maps with modern spellings and notes on the variation of place names. Some of his dates of landfall and departure differ slightly from the itinerary given above and are probably more correct.

Darwin's Insects in the British Museum (Natural History)

Although Darwin did not hold the specialists in the British Museum in high esteem this was not so of G.R. Waterhouse[10] as I have recorded elsewhere (Smith 1982*a*). Waterhouse was Keeper of Mineralogy and Geology in the British Museum from 1851 to 1880 and curator of the Royal Entomological Society's insect collections on its foundation. It was no doubt in the latter role that Darwin entrusted many insects to him and that through him many specimens came to be in the British Museum. Lea (1926) notes, quoting G.J. Arrow, 'Darwin did not give his collection to the Museum, but allowed different individuals to take particular groups which interested them, and the unsorted mass of minute specimens was given to G.R. Waterhouse, only coming here in 1887'. The Entomological Society collections were eventually dispersed; firstly the exotic species in 1858, then the British and certain historic specimens in 1863. The Museum purchased 5628 insects in 1858 (BM accession no. 1858–60) and in 1863 (1863–44) a series of 199 insects, of various orders, collected chiefly by Darwin during the *Beagle* voyage and including the types of species described by G.R. Waterhouse, J.O. Westwood and E. Newman.

The following list of summarized entries from the Museum Accession Registers indicates the numbers of Darwin insect specimens and the source of their origin.

1837.1.–1	1 specimen of Chiasognatus grantii	Chiloe	Pres. by C. Darwin
2	2 specimen of Chiasognatus grantii	Chiloe	Pres. by C. Darwin
1842.14.–	4 species of Coleoptera [names listed]	Tierra del Fuego	Pres. by C. Darwin. Originals of Mr Waterhouse's descriptions in the Annals & Magazine of Natural History, Vol. 9, April 1842.
1845.63.–	115 Coleoptera [names all listed]	[Various *Beagle* localities]	Pres. by C. Darwin. Originally described by Mr. Waterhouse in Annals & Magazine of Zoology & Botany
	13 Diptera	Galapagos	
	2 Orthoptera	Galapagos	
	1 Libellula	Galapagos	
	1 Xylocopa	Galapagos	
	44 Hemiptera	Galapagos	
	3 Aptera	Galapagos	
1845.68.–	26 Diptera	Montevideo	Presented by Charles Darwin
	7 Hymenoptera	Montevideo	
	6 Orthoptera	Montevideo	
	10 Aptera	Montevideo	
	3 Hemiptera	Montevideo	
1845.81.–	Ixodes	St Paul's I	Presented by Charles Darwin Esq
	1 Staphylinus	St Pauls I	
	2 Olfersia	St Pauls I	
1845.118.–	5 beetles [names listed]	Valparaiso and Pt Desire	Pres. by C. Darwin. Originally described by Mr Waterhouse in Ann. of Nat. Hist.

1846.38.–	9 Lepidoptera 10 Lepidoptera 4 Lepidoptera 2 Lepidoptera 1 Lepidoptera 5 Lepidoptera	Pt Famine, S. America Monte Video St Iago Keeling Is Galapagos Southern part of S. America	Presented by Charles Darwin Esq from the voyage of the *Beagle*
1848.95.–	3 Cleridae 1 Entomoderes erebi Solier	1 Sydney, 1 V.D's land, 1 Mt Wellington Mendoza	Presented by C. Darwin Esq.
1858.60.–	5031 insects [some listed by name]	Various localities	Purchased at sale of Entomological Society
1863.44.–	9 beetles [names listed]	[Various *Beagle* localities]	Collected by Charles Darwin on his late voyage of the *Beagle*; described by Revd W. Hope. For the continuation of this entry see Folio 839
	[on page 839 the names of a further 175 beetles are listed]	[Various *Beagle* localities]	Type specimens of species described by Messrs Waterhouse, Westwood & Newman in the Annals of Nat. History, Entomologist & collected principally by C. Darwin Esq. in the voyage of the *Beagle*
1885.100.–	1 Forficula sp. 2 Forficula sp.	Rio de Janeiro Patagonia (?)	Presented by G. R. Waterhouse. Collected by C. Darwin in the Forest in June.
1885.119.–	500 insects	Various localities	Presented by G.R. Waterhouse Esq. Collected by Charles Darwin during the voyage of the *Beagle*. See Ins. Room List p. 93

Many beetles seem also to have passed, through G.R. Waterhouse, directly into the Coleoptera collections. These are not covered by numbers in the Museum Accession Register but are recorded in a volume of 'Accessions to the collection of Coleoptera 1870–1909', kept in the Coleoptera section. These entries are as follows:

1871.2	17 Elateridae	S. America	Presented by Chas Darwin. Collected by Mr Darwin. Not to be Rep. 10th/ 71
1871.7	3 Elateridae	New Zealand	do. Not to be Reported May 1st 71
1871.17	2 Systolosoma brevis Solier 11 Lebiinae 2 Tautocerastes patagonicus	Chile S. America St Cruz	Presented C. Darwin, collected C. Darwin through Mr Waterhouse. Not to be reported
1873.8.	50 Hydradephaga	Patagonia etc	Presented by C. Darwin, Esq. through G.R. Waterhouse
1875.35	29 Coleoptera [names listed] all C. Waterhouse species	Terra del Fuego, Valparaiso and Falkland Is	Presented by G.R. Waterhouse collected by Mr Charles Darwin. Described in a paper read at the Entomological Society Nov. 3rd 1875 [see Waterhouse, C.O., 1875]
1875.36	[1751 Coleoptera]	[Various localities and sources, some Darwin]	Presented by G. R. Waterhouse

1877.1	4 Coleoptera 6 Coleoptera [a list of the names of the 8 species follows]	James I. Galapagos Charles Island	Presented by C. Darwin Esq, through G. R. Waterhouse. Not Rep.
1878.43	1 Strina aurichalcea	Cape of Good Hope	Presented G. R. Waterhouse, coll. by C. Darwin, Esq. Not to be reported
1879.34	17 Coleoptera [names listed] types of F. Waterhouse	Cape of Good Hope, E. Falklands, Rio and St Helena	Presented by G. R. Waterhouse collected by C. Darwin Esq, described by F. H. Waterhouse in the Linnean Journal
1880.67	1 Moluris [Tenebrionidae]	S. Africa	Presented by Chas Darwin Esq. This is the specimen referred to in the popular account in the Naturalist Oct or Nov. [Dec., p. 76 by S. D. Bairstow]
1887.42	2000 Coleoptera	Various localities	Presented by G. R. Waterhouse Esq. Collected by Charles Darwin in the Voyage of the *Beagle*

The '1871.2' entry also includes some Coleoptera from St Helena (see *Insect Notes* entry 3730).

It is not clear what the 'not to be reported' comment means against several of these entries. Perhaps it kept the material temporarily more freely available for loan to outside specialists if it remained among unofficial accessions. Some accessions of Waterhouse types (e.g., 1875–36) contain Darwin material although there is no indication of this in the entry (see *Insect Notes* entry 2303 under *Adioristus*).

Labelling of specimens

The majority of the specimens in the BM collections have printed BM data labels indicating the country, locality and the name C. Darwin. Often the BM accession number is also given on a separate printed label though sometimes this is handwritten. Some specimens do not have printed labels and these can be difficult to find, all the labels being handwritten (by Darwin (rarely), Waterhouse and others) and sometimes folded. Labels bearing the name of the species are frequently handwritten. The distinctive labels of other museums are described under the appropriate sections.

Some specimens bear original 'Darwin' labels and numbers, which link them directly to the *Insect Notes* entries described later. These labels are as follows:

(1) Original handwritten locality labels (by Darwin or Syms Covington but usually by others) (Figs 11, 19). Sometimes these may have a BM accession number written later or on the verso.
(2) A label bearing a handwritten (rarely by Darwin or Syms Covington and usually by later 'curators') number between 1 and 3868 usually on white paper or occasionally on coloured paper conforming to the code range described for the printed numbers below, but the number given in full (see Figs 11, 19).
(3) Printed numbers (Fig. 19) can usually be taken at face value if on white paper. If on red coloured paper then 1000 must be added to the number printed thereon, 2000 added for green and 3000 added for yellow (I have only seen *written* numbers on yellow paper; see *Insect Notes*, entry 2523). A clue to this numbering code is given in entry 325 in the *Insect Notes*, and it is described in Darwin's specimen catalogue in the University Library at Cambridge. In the University Museum of Zoology at Cambridge are specimens with small green labels bearing numbers but these are not Darwin's and are dealt with in the section on the Cambridge material.

Other comments on labels are given immediately before the *Insect Notes*.

There are certainly other undetected Darwin specimens scattered throughout the BM collections, especially in the unidentified accessions. While it has been relatively easy to locate material on which published descriptions are based, there has been difficulty in locating non-type material. Specimens representing published misidentifications have frequently been subsequently re-identified and moved to an unexpected place in the collection. However most groups have been scanned, and at least for the Neotropical Coleoptera it has been possible to comment on most of the entries in the *Insect Notes*.

Where specimens have not been located it has frequently been possible to interpolate the identity of some entries from published sources, especially the *Journal* (Darwin, 1845). Often the very nature of the entry in the *Insect Notes* has provided clues leading to a successful search for material in the collections.

Some specimens that were once in the collection have obviously been removed, probably for exhibition purposes on the occasion of a Darwin anniversary (see Ridewood, 1909: 23) or even in exchanges with other museums. Name labels with only pin-holes above them provide strong evidence for this (e.g. *Insect Notes* entry 5).

There is also evidence that Darwin specimens from the BM have 'found their way' into other collections, probably before the establishment of a proper loans system, but have 'returned home' in due course (see *Insect Notes* entries 2303, 2308 under *Adioristus*, Col., Curculionidae). There are also specimens in the David Sharp collection (BM 1905–313; see entry 618 under Nitidulidae).

Darwin's Insects in the University Museum of Zoology, Cambridge

In the main collection of the Zoology Museum at Cambridge are *Beagle* specimens of water beetles and water bugs as follows:—

Coleoptera, Hydrophilidae: 104 specimens representing 20 species; Gyrinidae: 21 specimens representing 7 species.

Hemiptera, Pelogonidae: 2 specimens representing 1 species (?); Corixidae: 1 specimen, unidentified.

These mostly bear a printed label as shown in the notes quoted and may have small green labels with numbers in the range 1–51, though no specimens were found with the numbers 1, 2, 9, 18, 26, 29, 32 or 41 (though the Corixid bears a white printed 41 which does not fit a Darwin entry—see entries 210, 677). Other specimens without numbers are present and probably all had numbers originally. Some specimens also carry printed numbers relating to the Darwin notebooks and *Insect Notes*. The specimens also bear A. Knisch (Hydrophilidae) or A. Zimmerman (Gyrinidae) det. labels (see entries in the main *Insect Notes*).

These specimens were formerly housed in a small box labelled as follows:

> To Dr Sharp. I send the first contribution to an Entom. Library. Also Darwin's aquatics from S. America. The tickets are no[t] intelligible to me. I have no corresponding notes. C.C. Babington[9]

To this has been added a note by Hugh Scott:

> These insects have since been named and incorporated in the general exotic collection. Though said to be from "S. America" (whence most undoubtedly are) they include certain species which can scarcely have been from that Continent: *Sternolophus solieri,* Cast., known from Afr. and Syria, and *Paranacaena* sp., a genus known (otherwise) only from Australia (both Hydrophilidae). The series included one or two Hemiptera fam. Pelogonidae. H.S. 24.4.1922

In the Cambridge Museum Register 14 November 1912 the following supplementary notes by Hugh Scott are given, dated 24 October 1922:

> These were formerly kept in a small box, just as they were handed to Dr Sharp by Prof. C.C. Babington. They were sent by Darwin to Professor Babington, and passed on by him to Dr Sharp, with the label which is stuck in below. They have now (1922) been named and incorporated in the general foreign beetle collection, the old pins being kept and the following label attached
>
> South America
> Charles Darwin
> Voyage of the
> "Beagle"
> Reg. 14.xi.1912
>
> They will be found under families Hydrophilidae and Gyrinidae [Darwin's Dytiscidae are in Brit. Mus. They were worked out by Babington and publd in Tr. Ent. Soc. iii, 1941,

pp. 1–17, Pl.1], also two or three bugs (Hemiptera) under (Pelogonidae and Corixidae). Re localities: Babington's note reads "from South America", and nearly all undoubtedly are South American. But the following are not from that continent: *Sternolophus solieri*, Cast. (Hydrophilidae; Africa & Syria); *Paranacaena* sp. (Hydrophilidae; genus known only from Australia); *Dineutes subspinosus*, Klug (Gyrinidae; Africa, Syria, India) and *Dineutes aereus*, Klug (Africa). These were probably got when the "Beagle" visited countries within their range.—The numbers borne by the specimens were not intelligible by Babington. In 1917 the collection was examined by G.C. Champion, who by consulting old literature was able to fix the localities of the big Gyrinid *Enhydrus sulcatus*, Wied., of *Gyrinus ovatus*, Aubé and of *Gyretes glabratus*, Régimbart; he attached the labels "Rio de Janeiro, C. Darwin" to these, but did not think the rest could be traced [see over page].

The full list is as follows:— [HYDROPHILIDAE] *Berosus (Enoplurus) reticulatus*, Knisch; *Berosus* (s.str.) *sticticus*, Boh. and its aberrations *confinis*, Knisch, and *aberrans*, Knisch; *Derallus rudis*, Sharp; *Hydrous ater*, Ol., **Hydrous (Diboloceles) palpalis*, Brullé; *Neohydrophilus politus*, Cast.; *Tropisternus (Cyphosternus) lateralis*, Fabr.; *Tr. nitidulus*, Brullé; *Tr.* (s.str.) *collaris*, Fabr.; *Tr. laevis*, Sturm, (=*nitens*, Cast.); *Tr. setiger*, Germar; **Sternolophus solieri*, Cast.; *Limnoxenus* sp.; *Paracymus* (s.str.) *debilis*, Sharp; *P.* (s.str.) *armatus*, Sharp; *Paranacaena* sp; *Enochrus (Lumetrus) vulgaris*, Stein; *E. (L.) affinis*, Stein; *Hugoscottia darwini*, Knisch; *Helobata (Helopeltis) striata*, Brullé; [GYRINIDAE] **Dineutes aereus*, Klug; **Dineutes subspinosus*, Klug; **Enhydrus sulcatus*, Wied.; *Macrogyrus ellipticus*, Brullé; *Gyrinus parcus*, Say; **G. ovatus*, Aubé; **Gyretes glabratus*, Régimbart.

Two kinds of printed numbers are attached; some specimens have numbers in large type, on (discoloured) white paper; these numbers correspond to Darwin's MS. Register in Brit. Mus. (Insect Dept.), and the data have been copied (1.xi.1922) from that register and attached to the specimens. The species under which such specimens stand are marked with an asterisk on the preceding page [there are numbers in similar large type on certain of Darwin's named Dytiscidae in Brit. Mus.]. Most of the numbers used are, however, in smaller type, on greenish-blue paper, with a printed line above and to one side of them. Of these there is at present no explanation, nor is it known when and by whom they were attached. They form a sequence from 1–51. Many specimens have no number. None have Darwin's MS. locality-labels, as the Brit. Mus. specimens have; except in the case of those with the big-type numbers, therefore, the evidence that they were Darwin's rests at present on Babington's covering label, & the similar nature of the pins, &c.

The presence of 'Darwin' numbers has enabled nine species to be assigned with certainty to entries in Darwin's *Insect Notes*. The other species have been interpolated and the following entries in the *Notes* should be consulted to account fully for these Cambridge specimens: 210, 213–9, 432–3, 446–8, 554–5, 573, 875, 1305, 1314, 3528, 3635.

There is also a small storebox (Figs 5–6) containing British beetles in the Museum of Zoology. The majority are ground beetles (Carabidae) and dung beetles (Scarabaeidae, etc.). Some of the species, though perhaps not the actual specimens recorded by Stephens are represented. There is an entry in the Museum Register regarding this collection dated 30 April 1913:

> Small collection of British beetles, made by Charles Darwin. The beetles were originally in a cabinet, until in the early '70s G.R. Crotch removed some or all of them into boxes, with the intention of arranging and renaming them. Only one box has been found, which was given to the Museum as Crotch left it, some of the beetles being named in Crotch's handwriting, others with printed labels. Whether the latter were Darwin's or Crotch's naming is not known. Donated by Sir Francis Darwin, F.R.S.

Crotch also gave Darwin beetles during the writing of the *Descent* where Darwin (1871: 379, footnotes 70 and 72 relating to stridulatory mechanisms in the Coleoptera) says:

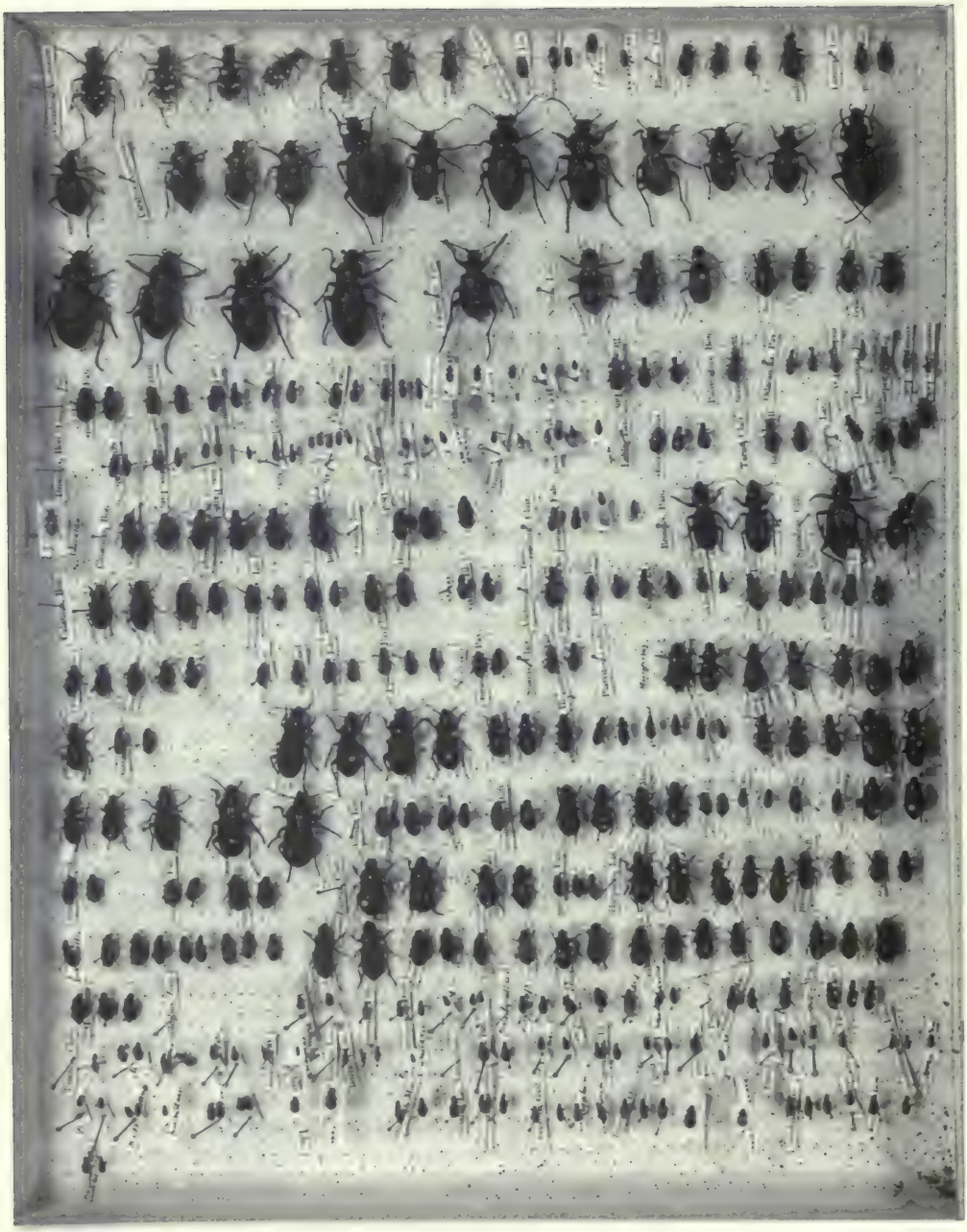


Figure 5

Figs 5–6 The store-box of British beetles at Cambridge: 5, left hand 6, right hand, sides (by courtesy of the Cambridge University Museum of Zoology).

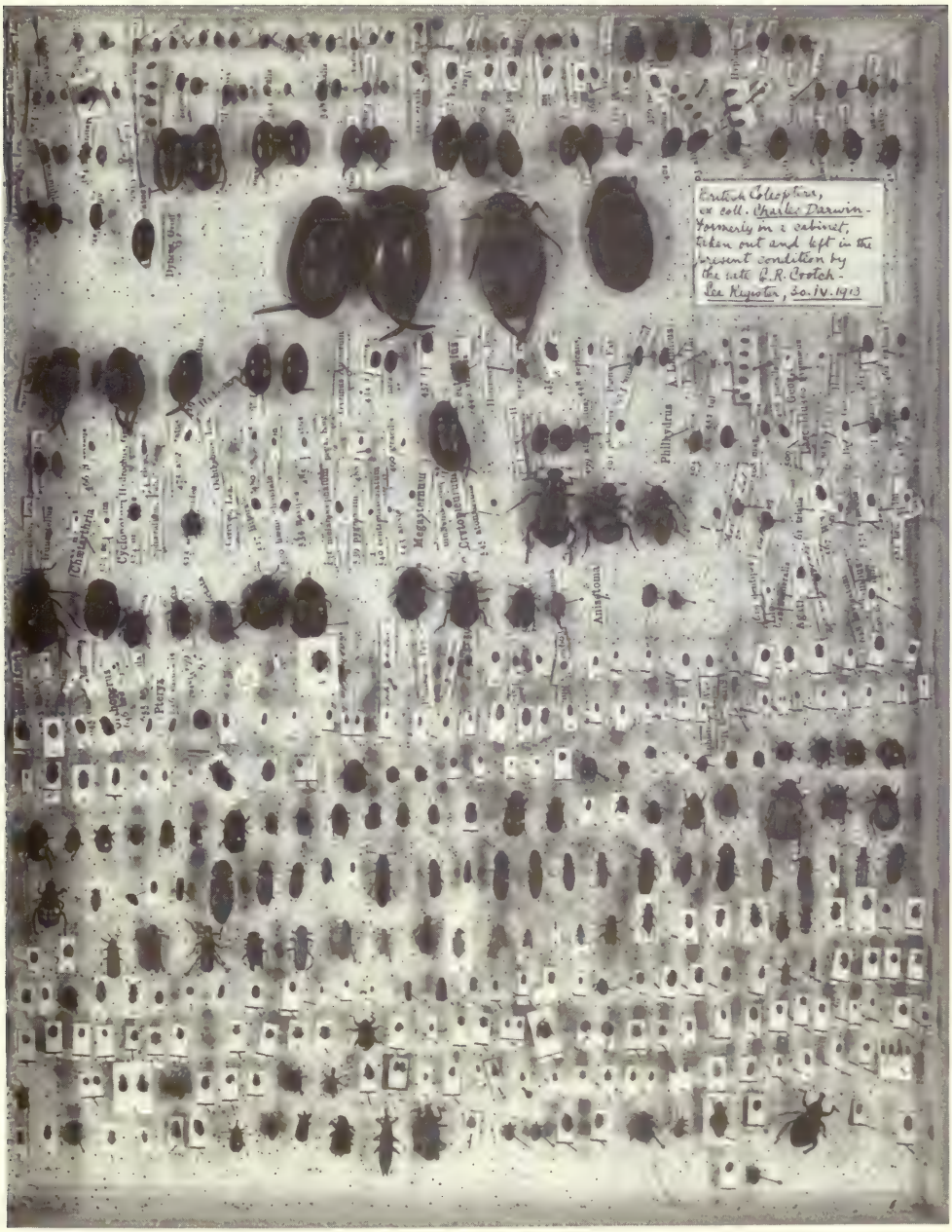

British Coleoptera,
ex coll. Charles Darwin -
Formerly in a cabinet;
taken out and left in the
present condition by
the late R. R. Crotch -
Sea Keynsham, Sa. IV. 1913

Figure 6

> I am greatly indebted to Mr G.R. Crotch for having sent me numerous prepared specimens of various beetles belonging to these three families [Crioceridae, Chrysomelidae, Tenebrionidae] and others, as well as for valuable information of all kinds . . . I am also much indebted to Mr E.W. Janson for information and specimens . . . In the Carabidae I have examined *Elaphrus uliginosus* and *Blethisa multipunctata,* sent to me by Mr Crotch.

A biographical note on Crotch is given by Smart & Wager (1977). See also under Darwin's British Insects for Cambridge holdings of Darwin material.

Darwin's Insects in the Hope Entomological Collections, University Museum, Oxford

The type specimens of various species described by F.W. Hope from Darwin material are present in the British Museum (Natural History) (e.g. *Calosoma patagoniense* Hope). However some of the material sent to Hope by Waterhouse remains in Oxford and according to a letter from Darwin to Hope postmarked 22 June 1837 this consisted of insects collected at Sydney, Hobart and King George's Sound (Poulton, 1909: 202). Some of these unidentified specimens have been removed from the general collection and are now kept in separate cabinets and include some Homoptera from Sydney and Hobart and a Chalcidoid Hymenopteran from Sydney. There are some unidentified Reduviidae (Heteroptera) from Sydney remaining in the general collections. In the Darwin-Hope letter mentioned there is also reference to some Coleoptera of which the 'carabi' were to be returned but these have not been located at Oxford and are probably back in the British Museum. Some Australian Coleoptera and Homoptera were described by G.R. Waterhouse (1838, 1839) and are listed (see *Insect Notes* entry 3528 etc.) with some other insects found.

Of greater interest is the presence of some Darwin insects in the Denny collection. Following information from F.G.A.M. Smit that he had seen a Darwin flea in that collection some 25 years ago, the flea was located in the Denny slide collection and is a female *Pulex irritans* L. from Chiloe mounted on a slide and represents entry 2561 in Darwin's *Insect Notes*. In the general Diptera collection at Oxford there is a drawer of Diptera and Siphonaptera which has inside a label indicating that the Denny fleas were sent to Rothschild in 1915. However no Darwin fleas have been located among the Rothschild collection in the British Museum. Since Denny was a specialist on lice, I searched for that order and found six specimens in the pinned part of the Denny collection (*Insect Notes* entries 1044, 1336, 1395, 2153 and 2561, and entry 658 in the *Spirits of Wine List*). Hitherto only one Darwin louse had been found (in the BM, see *Insect Notes* entry 1044).

Other Darwin insects will no doubt be found in the Hope Collections as G.R. Waterhouse says (1839: 189) of the insects included there:

> . . . insects were therefore returned to the friends who had been so kind as to lend them to me. I may remark that the greater proportion of them were from the collection of our liberal president, the Rev. F.W. Hope.

and later (1841: 121) under *Feronia cordicollis*:

> A specimen of this species has been sent to Mr Hope with the specific name of *obsidianus* but I have not yet found it described under that name.

Poulton (1910: 16) records Diptera used in various exhibits to celebrate the hundredth anniversary of Darwin's birth but the only member of this order located at Oxford is a *Bathypogon* sp. (Asilidae) found in the Bigot Collection by Greg Daniels (see entries 3524–3526).

Audrey Z. Smith (1986), Hope Librarian and Administrator, has published a history of the Hope Entomological Collections and may locate other Darwin material, but this will probably all be Australian.

Darwin's Insects in the National Museum of Ireland, Dublin

In 1971 Dr Martin Speight drew my attention to some boxes of insects in the National Museum of Ireland, Dublin, which appeared to have been collected by Darwin on the *Beagle* voyage. Investigations proved this to be so and the material was examined and the results are incorporated in comments in the *Insect Notes*. The specimens were mostly small Diptera and Hymenoptera which Francis Walker[11] had sent to A.H. Haliday[12] for identification. Francis Walker had described many of Darwin's insects (see References) but the collections he sent to Haliday appear to consist of the smaller fry mostly covered by general entries in the *Insect Notes* based on general sweeping in Bahia, Brazil; Chiloe Island, Chile; Galapagos Islands; Hobart; Tasmania; King George's Sound and Sydney, Australia; New Zealand and St Helena. However there were some specimens referring to individual entries in the diaries of greater interest.

The story of the disposal of these specimens can be gleaned from correspondence from Walker to Haliday (*Haliday Correspondence*, Vol. 2) preserved in the Library of the Royal Entomological Society of London as follows:

Arnos Grove,
Southgate
8 March 1837

> . . . Mr Darwin (grandson of the celebrated doctor Darwin) who has been travelling for the few past years through the E and W coasts of South America and the Pacific Isles and N. Holland and has made numerous interesting discoveries in geology and zoology—has lately returned to England with his collections—He has entrusted the insects to Waterhouse who will describe the Coleoptera. I was so interested in the chalcidites that I have acceded to W's request that I should describe them. He is at a loss what to do with the *Muscidae, Ichneum adscits* [?] *Thrips* (of which there are some Fitans [?] half an inch long) etc—and wishes me to offer them to you to describe in whatever Ent work you please, he would like to have an answer soon. I think you will find them very interesting and we can easily send them to you.

The next letter is dated 27 May 1837 and is written from the same address. It begins:

> My Dear Haliday,
> I have delayed writing to you till I could procure some of Darwin's insects to accompany my package. Waterhouse has been very busy so he requested me to pick out and mount some. Having done this I sent you a few near a fortnight ago per Belfast steamer, with the other insects that I promised, also one parcel from Mr Curtis and two from Mr Rudd [or Budd?]. Waterhouse requests that you will keep the No. attached to each lot as Darwin has MSS notes attached to some. He will I believe make an application to government to patronize the publication of his travels, if he succeeds all these specific descriptions will of course be included therein.

Later in the same letter he says:—

> I do not remember any recent works on Hymenoptera or Diptera of the regions where Darwin has travelled. There may be a few in the 10th Vol of the Encycl. Method.* and in Fabr Syst Piezat† which I will send to you if you have them not.

**Encyclopédie Méthodique* . . . Paris & Liege, 1789–1828.
†Fabricius, J.C., Systema Piezatorum. . ., Brunsvigae, 1804.

Later in this letter Walker says he will take specimens to Liverpool in September. The correspondence shows clearly that Walker and Haliday expected to meet at the Liverpool meeting, in September, of the British Association for the Advancement of Science (of which they were both Life Members).

The next letter was written on 15 July 1837 from the same address. It begins:

> My Dear Haliday
> I have received your kind letter announcing the safe arrival of the insects etc. I am sorry to hear that your health has suffered and I fear that this is partly occasioned by working too closely at the minute Hymenoptera which I have inflicted upon you. I well remember to have seen a figure of *Dicera* and to have been struck with its singularity, but I did not recognize it among Darwin's insects. Of these I have a few more *Diptera* etc for you which I had *set* before I received your letter. Darwin still has multitudes of them, and if I can procure them for Waterhouse before I leave I will bring them in pill boxes as you advise.

Later in this letter he says:

> Almost all that I have seen of Darwin's Diptera are as minute as those that you have. The chalcidites also are generally remarkable for their identity with the British forms. And the same may be said of the Coleoptera among which the species of Scymnus are very numerous. On a recent coral isle [St. Pauls] the only insects were bird parasites and a few Coprophagi such as a Staphylinus (Philonthus or Quedius) etc. Another isle the only species of insect was a small ant.

The next letter is written from 49 Bedford Square and is dated 19 December 1837. It includes the following:

> I have told Darwin and Waterhouse about the Diptera, and they have looked out some more for you and will have them ready in a few days and I will send them to you before a month hence, also a parcel which Curtis tells me he has ready for you.

This letter goes on to show that the two correspondents did in fact meet in Liverpool the previous September. And also states:

> I now have a lot of MSS waiting to be published in the Ent. Mag., and I must send the description of Darwin's Chalcidites to the Linn. Society or elsewhere.

Later he continues:

> I will write to you again when Darwin's insects are ready and will send the parcel to the Belfast steamer office directed to Mr Gordon for you.

The next letter is dated 17 February and post-marked 1838. It begins:

> I have hitherto delayed replying to your letter of December last that I might obtain as many as possible of Darwin's Diptera etc to form part of the parcel that I have just forwarded to you.'

The letter discusses some of the insects which are in the parcel and then continues:

> In the box also are all Darwin's Diptera yet unpacked. He has plenty more but they are in little boxes mixed with other insects and he is about to have them all mounted and then sorted. Those from the Galapagos are all the Diptera I have found among the insects yet mounted. The man employed unfortunately put them into water but he will know better in future. Though the Galapagos are situate under the line yet the insects found therein are very like those of the temperate climes and so it is with other little isles that are far from the mainland.

Later this letter continues:

> I have placed a few of Darwin's chalcids in the box for your examination. Figures of some of them would be very interesting excepting No. 1 they all appear to belong to the family Eucharidae of which I have seen no European specimens. In the structure of the head, antennae and abdomen they much resemble Figites etc.

Later he continues:

> The steamer with the box will leave London tomorrow.

And later again:

> Have you determined where you will publish Darwin's insects? I have got ready enough MSS in British Chalcid to last the Ent. Mag. for a couple of years and I wish to publish Darwin's Chalcids somewhere else.

In a letter dated 29 July 1839 Walker writes:

> My descriptions of Darwins Chalcides are printed and will be published immediately. I have all the specimens in my possession and I will forward them to you together with all my own collection and they will be speedily followed by the few remnants that I have left. you are quite welcome to retain mine as long as you feel inclined and what I ask of you is in plain words that you will point out my errors, supply my omissions, reunite the species that I have cut up and divide into groups the overpopulous and disordered genera. Your drawings of the genera would be most suitably accompanied by such an essay . . . . I have about half a dozen more of Darwins insects for you.

The drawings referred to in this letter would be those which subsequently appeared in *The Entomologist* (see Walker, 1840–42).

Various labels in the boxes indicate that the specimens had been seen (though not studied or recorded) by several specialists over the years. In box number 546 (H.28) was a label 'There is no doubt these are some of Charles Darwin's insects collected on cruise of the *Beagle*. See Hal. diary for date of receipt of same from F. Walker. A.W. Stelfox. 1932'. Beneath this label is another 'All these certainly not European (Collin)'; this would be J.E. Collin, the Dipterist. There is also a label with printed 'Haliday' and written on 'Miscellanea (chiefly Diptera) numbered 3527, 3523, 2368, 2369'. The specimens are grouped in blocks around single labels bearing these numbers (including also 3528) which refer to Darwin's notes. In box H[aliday] 24 (542) there is a note 'seen by Prof. Westwood 1885–6' and written on the bottom of the box 'Coll by Charles Darwin when in the "Beagle" AWS.' This box also contains some Walker insects from Finmark. The specimens in this box are pinned in fairly orderly columns above the labels which bear written numbers and locality data.

Fig. 7 The contents of 'box 73' from the Haliday collection in the National Museum of Ireland, Dublin. The specimens from St Vincent or with numbers in the sixteen hundreds are not Darwin material. The Darwin specimens include Hymenoptera of the subfamily Braconinae from Brazil and the Galapagos Islands and some Diptera (Chloropidae and Agromyzidae) from New Zealand. See *Insect Notes* 3363, 3416, 3528, 3859, and 3860.

A box numbered 555 (R.H.5) is divided inside by the pinned-in labels 'Box 73' and 'Box 69' and the former section is further labelled on the bottom of the box 'undoubtedly some of Charles Darwin's insects A.W.S.'. Also in the 73 section is a Haliday label 'Brazil (b) N. Zealand I. St. Vincent etc etc'. Of these the St Vincent specimens are not Darwin material (Fig. 7).

Box number 566 (H.68) contains Diptera, some bearing individual handwritten data labels and others either bear or stand over Darwin printed numbers. Boxes 536 (H.17) and 538 (H.20) contain parasitic Hymenoptera bearing 'Darwin' numbers 3524, 3858–3861.

All this material is included in the appropriate entries in the *Insect Notes*. In addition to the above more obvious material there may be Darwin specimens, as yet unrecognized, scattered elsewhere among the Haliday collection. General comments on the Haliday collection are given by O'Connor & Nash (1982).

Darwin's Insects at Down House and elsewhere

At Down House there is a storebox of beetles (Figs 8–9) which has been illustrated and variously reported in the literature as containing specimens from the *Beagle* voyage (e.g. Huxley & Kettlewell, 1965). However, with one exception, these insects are all British species and lack data, though some stand over printed name labels. The one non-British specimen, the largest in the box, I had taken to be a battered female of *Chiasognathus grantii* Stephens when I examined the specimen (see *Insect Notes,* entry 2110). However my colleague R.D. Pope, on seeing the photograph identified it as *Euchirus longimanus* L. (Scarabaeidae). This is certainly not a *Beagle* specimen as the species occurs in Amboina Ceram. Darwin quotes Wallace's observations on stridulation in this beetle in the *Descent* (Darwin, 1871: Vol. 1, 381) and it may be that Wallace gave him this specimen or it may have come from the entomological dealer E.W. Janson who supplied him with various horned beetles at this time (see Stecher, 1969: 113).

The British beetles in the box are mostly common species and probably represent his own collecting unless the named specimens form part of the gift of *c.* 160 species he received from Hope (see Darwin, F., 1887). Neither the species recorded by Stephens (1827–45) nor the species recorded so enthusiastically in the *Life and Letters* (Darwin, F., 1887) are present.

In Down House there is also a small oval box of European beetles on display. These are obviously the Scarabaeidae that Darwin studied for the chapter on sexual selection in Vol. 1 of the *Descent,* i.e. *Bubas bison* Boucomont (now in *Onthophagus*), *Oryctes grypus* Illiger (=*nasicornis* L.), *Lethrus cephalotes* Acharius and *Geotrupes stercorarius* L. Labels are present in the box but not all attached to the specimens. There is also a label for the moth *Lampronia calthella* L. (now in *Micropterix*) recorded as eating the pollen of *Mercurialis* in *Cross & Self Fertilization* (Darwin, 1888: 421).

Other locations

Bynoe (the acting surgeon—see Notes p. 113) collected plants, birds and possibly minerals for the official naval collections at the Haslar Hospital. Gunther (1912: 5) states:

> The Zoological Collection at the Haslar Hospital which contained the Fishes of the Voyage of the "Erebus" and "Terror" as well as other types was transferred to the BM in 1855. The specimens arrived without labels and were in a bad condition, and for economy's sake a solution of chloride of zinc had been used instead of alcohol.

In the BM accession books, there are several entries for insects from the Haslar Hospital (e.g. 1855–58, 60, 61, 63) in some of which lists of species are given but none appear to have any connection with the *Beagle* voyage. In Francis Walker's *List of Diptera* (1849) there is a list of donors which includes 38 entries under Haslar Hospital, but again, none appear to be connected with the *Beagle*. Lloyd & Coulter (1963, *Medicine and the Navy* 1200–1900, Vol. 5, 1815–1900, p. 75) state that Bynoe's collection of birds and insects is 'now in the British Museum' and his plants in the Royal Botanic Gardens, Kew but they give no source for this information. In the BM accessions book for 1844, item 4 (Jan) lists 1627 insects collected in 'New Holland N. & N.W. Coast and [Houtman's] Abrolhos, presented by [Haslar Hospital], collected by [J crossed out] Bynoe Esq Surgeon RN [Note B. Bynoe was surgeon in H.M.S. Beagle, and the types of insects described by Adam White on Stokes' Voyage of Discovery, 1846 appear to be in this collection]'. The entry is written in ink and the square brackets indicate pencil comments added later by K.G. Blair. The

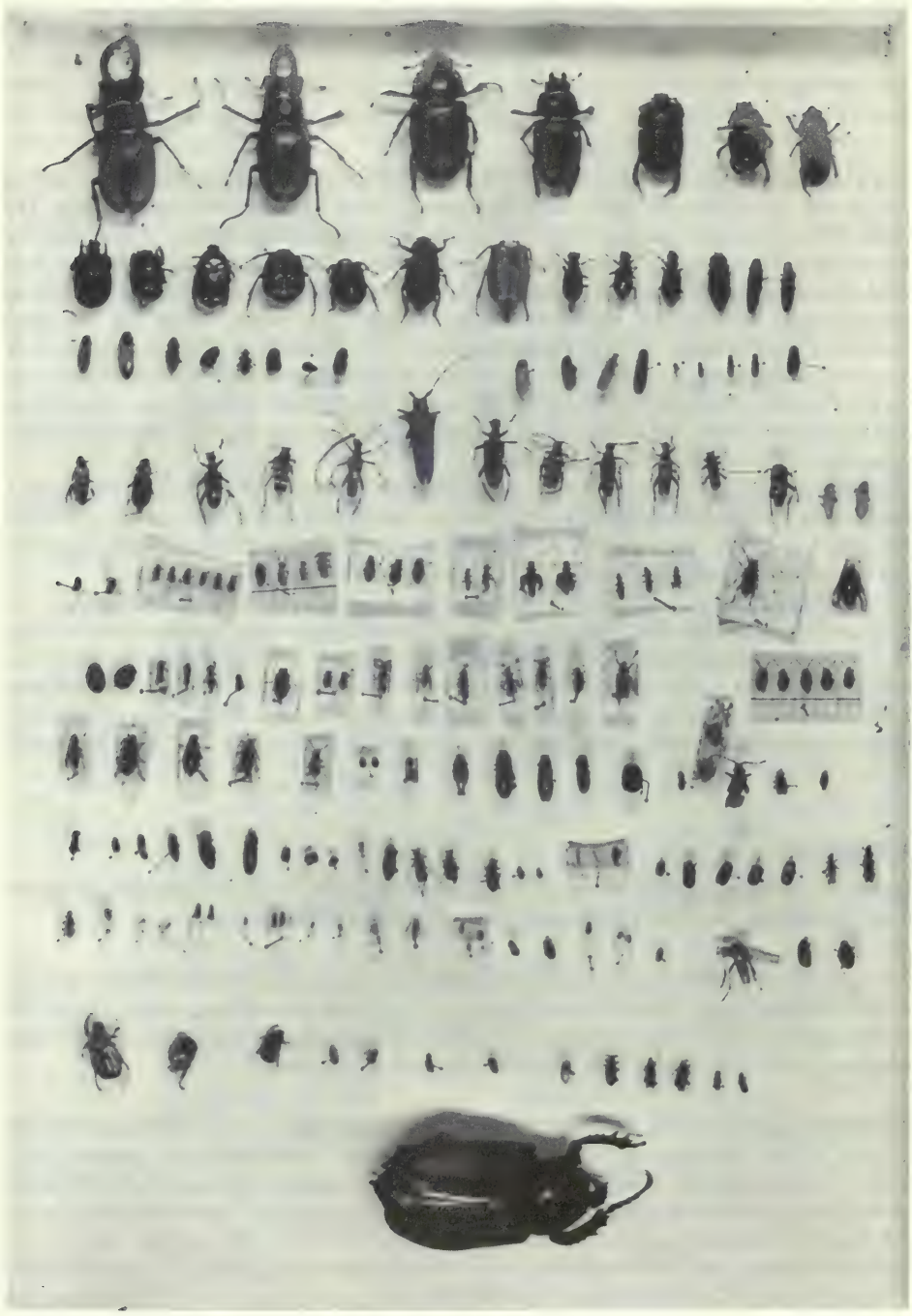


Figure 8

Figs 8–9 The store-box of British beetles at Down House, and the specimen of *Euchirus longimanus* L. (Scarabaeidae), not connected with the *Beagle* voyage: 7, left hand 8, right hand, sides (photograph by Philip Titheradge, courtesy of Down House and the Royal College of Surgeons of England).

Figure 9

Stokes referred to is John Lort Stokes (1812–43, Naval Officer, Admiral, 1877) who served on all three voyages of the *Beagle* (Darwin was only on the second) and was the author of *Discoveries in Australia* published in 1846. It was in an appendix to this work that Adam Smith described new Coleoptera and E. Doubleday new Lepidoptera from Australia. A.C. Pont has located a specimen

of *Dichaetomyia reversa* (Walker) (Diptera, Muscidae) in the BM collection bearing this accession number and the labels 'Scyomyza reversa Walk/one of Walker's series so named' and 'New Holland/J. Bynoe, R.N./B.M. 1844–4'. No Darwin specimens appear to be involved. Captain FitzRoy assisted by his servant Harry Fuller also made collections on the *Beagle* voyage but it is doubtful if these included insects.

David Stanbury has shown me a copy of a rather poor drawing of a butterfly made by Midshipman King aboard the *Beagle*. No specimen has been found to establish its identity, but R.I. Vane-Wright suggests that it could be a species of *Dione* (Nymphalidae). The drawing is located in the 'King Album of Sketches and Engravings' in the Mitchel Library, Sydney, Australia. Finally Kritsky (1981) records the presence of a staphylinid beetle in the Field Museum of Natural History in Chicago but no further information is available.

Doubtless other Darwin insect material reposes unstudied in other museums. A.F. Amsden thinks he has seen specimens in the Rippon collection in the National Museum of Wales. Certain groups of insects mentioned in the *Insect Notes* seem to be absent from the collections so far studied, such as aculeate Hymenoptera, dragonflies, some butterflies and among the beetles *Cicindela, Blaps* and *Meloe*. The important 'Benchuca' bug which may have been responsible for Darwin's illness (see *Insect Notes* entries 2913, 3423) has not been located. Evidence for odd specimens having been sent to individuals is cited in the *Insect Notes* (e.g. entry 3528, to G. W. Kirkaldy and W. E. Shuckard). The author would be pleased to have details of any future findings of Darwin material.

Darwin's Insect Notes

Barlow (1945: 265) describes Darwin's notebooks on his collections as follows:

> Two sets of three note-books each sewn together with string form the catalogue of the specimens he sent home. One set included 1529 specimens all in spirits of wine—fishes, insects, sea-weeds, fungi, spiders, plants, corallines, reptiles, etc., each listed with a number as it was put into the bottle—and therefore in chronological order. The second set of three notebooks has *printed numbers* on the covers; they are again a mixed bag of bird, beast and plant life.

The original notebooks are preserved at Down House and have been studied.

The *Insect Notes* (Figs 11, 12) referred to throughout this paper are preserved in the Entomology Library of the British Museum (Natural History) and are entitled *Copy of Darwin's notes in reference to Insects collected by him*. There is a note by G.R. Waterhouse 'Many specimens from this collection were presented by C.O. Waterhouse. Reg. No. 85.119. Some of them bear Nos 1–4 as per label':

1. Sydney 3528
2. Van Dieman's Land
3. Bahia [not 3 of this journal]
4. King George's Sound Australia

There is a further note:

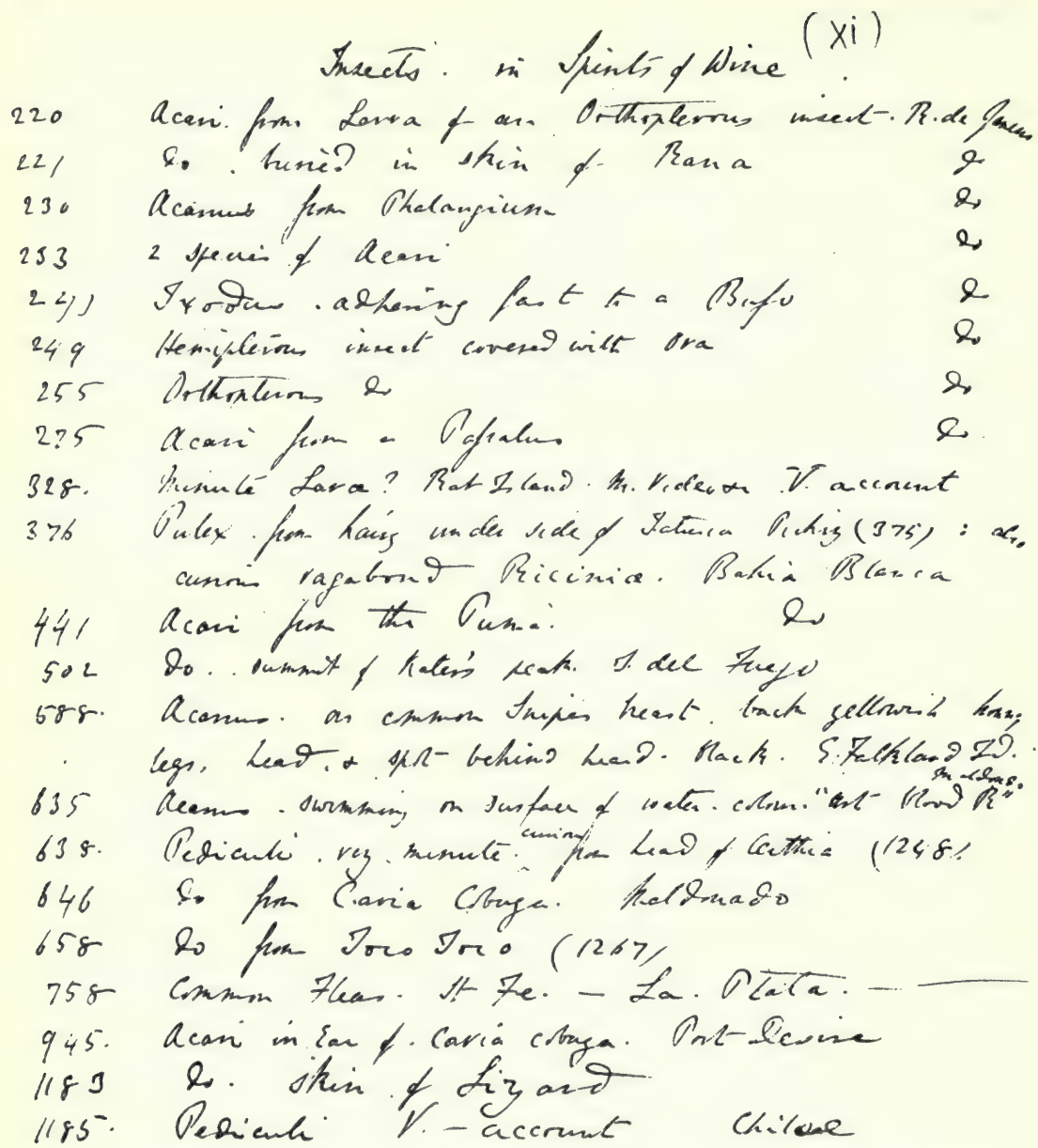
> This is the original MS of the "Insect Notes" sent to Waterhouse by Darwin. It is in the hand of Syms Covington, with additions and corrections by Darwin. It is analogous to the notes on Reptiles and Amphibians in the General Library of the B.M.(N.H.) and the notes on Plants, Birds, Fish, Mammals and Shells at the Cambridge University Library. Duncan M. Porter—16 April 1981.

Porter (1983) briefly draws attention to the *Insect Notes* and Sullaway (1982) dates them as probably being written during August 1836. Porter was misled into thinking that these notes were lost because of two entries in the bulky volume of *Insect Room Lists* (in BM): page 21, 'Darwin, C. List of numbers referring to insects collected by — during voyage of *Beagle* (List missing 5.4.27). Still missing Nov. 1976' and page 93 'Darwin, C., copy of Darwin's notes in reference to Insects collected by him'. Clearly it is the list of numbers that was, and still is, missing. Probably the *Insect Notes* had been wrongly inserted in the vacant spare at page 21 leaving the correct place in page 93 empty. The entry for the list of numbers is repeated in the *Insect Room Lists* (index) under B (for *Beagle*), again with the comment 'missing 5.4.27'.

In the Cambridge University Library is a short manuscript list in Darwin's hand *Insects in Spirits of Wine*. The full list of *Insects in Spirits of Wine* is illustrated (Fig. 10) and can be seen to consist largely of Acari (not insects). The insect entries from this list are given before the main *Insect Notes* with comments by the present author given in smaller type or in square brackets.

Insects in Spirits of Wine

249. Hemipterous insect covered with ova
No specimen found.


Insects. in Spirits of Wine (Xi)

220 Acari. from Larva of an Orthopterous insect. R. de Janeiro
221 Do. buried in skin of Rana Do
230 Acarus from Phalangium Do
253 2 species of Acari Do
241 Ixodes. adhering fast to a Bird Do
249 Hemipterous insect covered with Ova Do
255 Orthopterous Do Do
275 Acari from a Cassalus Do
328. Minute Larva? Rat Island M. Videon V account
376 Culex. from hairy under side of Tetrica Vicking (375) : also common vagabond Riccinia. Bahia Blanca
441 Acari from the Puma. Do
502 Do. summit of Salen peak. S. del Fuego
588. Acarus. on common Snipe. heart. back yellowish hazy legs. Head & spot behind head. Black. E. Falkland Id. In collection
635 Acarus. swimming on surface of water. common "Salt Flood R^s"
638. Pediculi. very minute. cunning from Head of Cattle (1248)
646 Do from Caria Branca. Maldonado
658 Do from Toro Toro (1267)
758 Common Fleas. St Fe. — La. Plata. — ——
945. Acari in Ear of Caria Branca. Port Desire
1183 Do. skin of Lizard
1185. Pediculi V. — account Chiloe

Fig. 10 The *Insects in Spirits of Wine* list in Darwin's holograph (by courtesy of the Syndics of Cambridge University Library).

255. Orthopterous Do.

No specimen found.

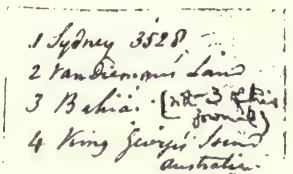
328. Minute Larva? Rat Island M. Video. V account [error for IV]

[On a separate sheet in Syms Covington's hand is the following:]

'1833 Insects June (IV) (610 or 328 [in margin])'

Copy of Darwin's notes in reference to Insects collected by him

Many specimens from this collection were presented by
C.O. Waterhouse. Reg. No. 85.119.
Some of them bear nos 1-4 as per label:—



This is the original MS of the "Insect Notes" sent to Waterhouse by Darwin. It is in the hand of Fynes Covington, with additions and corrections by Darwin. It is analogous to the notes on Reptiles and Amphibians in the General Library of the BM(NH) and the notes on Plants, Birds, Fish, Mammals, and Shells at the Cambridge University Library. Duncan M. Porter - 16 April 1981.

Fig. 11 The cover of Darwin's *Insect Notes* showing the title in Darwin's holograph, the notes by G. R. Waterhouse and Duncan M. Porter and sample Darwin labels (by courtesy of the Trustees of the British Museum (Natural History)).

(1834.) December. Insects. Archipelago of Chonos. Pselaphidæ and small Staphylinidæ, the most abundant insects.

2438. Fly. bred from the soft putrid kelp on the coast of Tres Montes. I never saw such immence numbers in clusters under side of stones.

2444....2455. Insects, from under stones at an elevation of 2500 feet, bare Granite mountain ..... 2455 "Patch Cove" North part of Tres Montes.

2444. 2445. Curious Hemipterous insects; it may be remarked these are 3 species of Curculio The Elater in numbers were far most abundant; this is a good example of the Alpine Entomology of this part; for I studiously turned up very many stones; Libellula 2455 from base of mountain.

2452. Carab. Trechus. Ynche Island, in the Island forest

2453. Curculio. Do Do

2474. Coronula from whale, Chonos Archipelago June X 1835.

2482. 2483. 2484. Coleoptera. from B. Blanca Patagonia.

2485. Acari (black) under stones and on putrid vegetable matter; on beach in immense numbers. Chonos. Archipelago

2486. Fly. (biting my flesh). Do

2497. Fly. on coast. Lowes Harbour. Do

2505. 2506. Coleoptera, in dense forest. Do

2507. Cicada. Do

2508. Carab: young. Do

2509. Diptera. Hymenoptera. Coleoptera, all the above insects, taken on borders of wood by sweeping. Lowes Harbour. Do

2520. Carabus, Centre of Chiloe, in forest, at head of water; all 3 under one log of wood.

Fig. 12 A typical page of the *Insect Notes* in Syms Covington's holograph with corrections and additions by Darwin. The paper is faintly ruled and watermarked 'J. Whatman 1834'. (By courtesy of the Trustees of the British Museum (Natural History)).

The following facts I have noticed at Monte Video and frequently in this place:— After a heavy thunder storm in a little pool in a courtyard which had only existed at most seven hours. I observed the surface strewed over with black specks: these were collected in groups, and precisely resembled pinches of gunpowder dropped in different parts on the surface of the puddle.—These specks are Insects of a dark leaden colour; the younger ones being red. —Viewed through a microscope, they were continually crawling over each other and the surface of the water; on the hand they possessed a slight jumping motion.—The numbers on each pool were immense: and every puddle possessed some of the pinches . . . What are they? and how produced in such countless myriads? We have seen their birth is effected in a short time, and their life, from the drying of the puddles can not be of a much longer duration.

My colleague Peter Lawrence concurs with me that these are Collembola and points out that one of the common names for Collembola, other than springtails, is gunpowder mites! No specimens have been found.

376. Pulex from hairy underside of Tatusia [= Dasypus] pichiy [Pichi] (375) curious vagabond Ricinia. Bahia Blanca.

No specimen found but F.G.A.M. Smit suggests that this Armadillo flea must have been *Malaeopsylla grossiventris* (Weyenbergh) or the less common *Phthiropsylla agenoris* (Rothschild). In the *Zoology* (Darwin, 1838: pt. 2, 92–3) two species of armadillo are discussed, *Dasypus hybridus auctt.* and *D. minutus auctt.* Of entomological interest is the description of the gut contents of the latter 'Coleoptera, larvae, roots of plants and even a snake of the genus Amphisbaena'.

638. Pediculi very minute curious [inserted] from head of Certhia (1248)

PHTHIRAPTERA: no specimen found. See entries 450 and 451 in the *Insect Notes*. In the *Ornithological Notes* No. 1248 refers to a third species of *'Certhia'* with bluish legs and entries 1250–1256 discuss the three species at length (see Barlow, 1963).

646. Do. from Cavia Cobuga Maldonado

PHTHIRAPTERA: no specimen found. The host mammal is the Aperea (Guinea pig) described in the *Zoology* (Darwin, 1839: pt. 2, 79) as *Cavia cobaia* Auct (? = *C. aperea*).

658. Do. from Toco Toco (1267)

PHTHIRAPTERA: in the Denny collection at Oxford is a louse on a card labelled 'Ctenomys braziliensis C. Darwin'. Darwin (*Journal*, 1845: 50; *Zoology*, 1838: pt. 2, 79) writes at some length on this rodent (the Tucutucu) which he found at Maldonado, kept several alive and preserved one in spirit from which this louse undoubtedly came.

758. Common Fleas. St Fe—La Plata

SIPHONAPTERA: no specimen found.

1185. Pediculi V.—account Chiloe

[Phthiraptera. A separate sheet in Syms Covington's hand '34. Pediculus. Chiloe. July' gives the following account:]

These disgusting vermin are very abundant in Chiloe: Several people have assured me that they are quite different from the Lice in England: They are said to be much larger and softer (hence will not crack under the nail) they infest the body even more than the head.—I should suppose they originally come from the Indians, whose race is so predominant with these Islanders.—I have little doubt this is the kind so common amongst the Patagonians of Gregory Bay; they are said to be there also very large.—An accurate examination of these specimens will at once decide the fact of identity or difference.—Mr Martial, a surgeon of an English Whaler assures me that the Lice of the Sandwich Islanders are blacker and different from these, or any lice, which he ever saw.—Several of the natives lived for months and cruized [sic] in the ship, no efforts could free their bodies from these parasites but he assures me as a certain fact, known to every one on board that their Lice if they strayed to the bodies of the English in 3 or 4 days died, and were found adhering to the linen (like Pediculi from Birds or quadrupeds?). So that the Sailors, who

constantly slept close to the Sandwichers never were *constantly* infested by their vermin.—If these facts were verified their interest would be great.—Man springing from one stock according his *varieties* having different species of parasites.

A version of this appears in the *Descent* (Darwin, 1871: vol. 1, 219). See also entry 2561. This appears also in the *Zoological Diary* (preserved at Cambridge) but with the final additional comment 'It leads one into many speculations' which has then been crossed out. While races of human lice have been described in the literature, not enough critical work has been done to substantiate the above comments. Work with head lice suggests some evidence of geographical and racial differentiation and first instar lice can change colour to blend with their surroundings. Many factors affect the size of a louse. Nevertheless the entry provides an insight into Darwin's thoughts on these matters.

Insect Notes

The *Insect Notes* are in Syms Covington's hand and are here set in larger type. Important (i.e. not letters in the middle of words) corrections and additions in Darwin's hand are given in **bold type** as near as possible to the place in which they occur in the *Insect Notes*. The present author's comments are set in small type beneath each entry and interpolations are given in the appropriate type size in square brackets. Lettered entries (as (a), (b), etc.) refer to comments by Covington or Darwin on the verso of the page in the notes but for convenience these are given here immediately beneath the main entry to which they refer. Headings from the top of each page of the notes are given (in italics) as they occur, including the page number, even when this splits an entry. The ditto entries are interpolated when it is not obvious to which part of the entry they appear to refer. Thus, as far as possible the actual layout of the notes is preserved. Geographical locations are indicated in full in square brackets, where this is not already clear, which should facilitate the practical use of the notes by specialists looking up a particular entry. For the same reason related entries are often cross referenced so that a specialist can quickly assess the data relating to a particular group or association in different parts of the notes. All scientific names and localities are fully indexed.

For brevity the location of Darwin material is indicated as follows:

BM = British Museum (Natural History) and where specimens have been located the year and museum accession number follows in brackets, e.g. BM (1885–119). Where locality labels are not specifically quoted it may be assumed that such labels are present. Labels with numbers linking the specimen to a specific entry in the notes are always quoted and where they are not the assignment to an entry has been interpolated and an explanation is usually given.

Cambridge = University Museum of Zoology, Cambridge.

Oxford = Hope Entomological Collections, University Museum, Oxford.

Dublin = National Museum of Ireland, Dublin.

Further details of the material in these repositories are given in the appropriate introductory sections and information on the few other repositories is cited in full in the entry concerned.

All references to Darwin material in the literature are cited by author and date (and pagination for original descriptions of genera and species) and given fully in the list of references. Repeated text references to Darwin's own works are made by a single familiar word from the title, e.g. *Journal* [*of Researches . . . during the voyage of H.M.S. Beagle . . .*] (Darwin, 1845), but for accuracy author and date are also cited to link them to the list of references. Pagination is cited when the item is not indexed in the *Journal*. A problem with Darwin's own works and in his citation of others has been which edition to cite. Clearly where Darwin's own indication is obvious this has been cited. However since some of the original works are rare or unpublished and relatively inaccessible, later, more readily available editions are included in the list of references where they are cross-referenced to the original source, or included in the annotations (e.g. *Anson*, 1748 and Darwin's *Journal*, 1845).

Where the insect order or family is not obvious from Darwin's entry this information is added in the present author's comments.

Since much of the material examined is located in collections where taxonomic research is in progress the author has been anxious to avoid unwittingly creating new combinations, new synonymy or type fixations. Therefore no indication of type status is made nor are type labels described unless this is essential to the interpolation of the particular entry. Similarly synonymy is only indicated where known to be published, at least in a catalogue.

The main purpose of the comments on the *Insect Notes* is to indicate the present location of Darwin's material and as far as possible to allocate it accurately to the entries in the *Insect Notes* and with the published work of Darwin and others. Future taxonomic work by specialists on each group can proceed from there.

At the top left hand corner of the first page of the *Insect Notes* is an entry (enclosed in a rectangular rule and in Darwin's hand **'N.B.—Letters (as (a) (b) refer to the back of the same page'** and in the right hand half of the top margin the word **'copy'.** Darwin's insertions to indicate page numbers appear mainly to refer to his unpublished *Zoological Diary* now preserved in the Cambridge University Library.

1832 *Insects* *1.*

2. Taken on board. Jan. 10th. Lat. 21°2′N

This probably refers to the specimen of *Nomophila noctuella* Denis & Schiffermueller (Lepidoptera, Pyralidae) which was recorded (as *Stenopteryx hybridalis* Hübner) by Walker (1859: 812) and is a known long-distance migrant from North Africa. No specimen has been found in the BM collection but the name label indicates its one time presence. See also under entry 5 below.

3. Acrydium. Owing to prevailing winds must have come from Cape Blanca, in Africa, 370 miles, distant Jan 13th. Vide. **Kirby** Vol. 1. Page. 224

In Darwin's *Diary* (Barlow, 1933: 22–3), entry for January 14th and 15th is the comment 'Some few birds have been hovering about the vessel and a large gay coloured cricket found an insecure resting place within reach of my fly-nippers. He must at the least have flown 370 miles from the coast of Africa'. No specimen has been found. The Kirby reference is clearly to Kirby and Spence's *Introduction to Entomology,* probably the third edition (1818) (this book was on board, see Burkhardt & Smith, 1985) which gives, on the page cited, a record of locusts flying on board a ship 200 miles from the Canary Islands. See also the *Journal* (Darwin 1845: 159).

4. Jan. 14th—10 miles at sea from St. Jago. [Cape Verde Islands]
Lost

Possibly a moth (see 5)

5. Jan. 12th Lat: 19°. insect

Three species of Lepidoptera described from St Jago and otherwise unaccounted for may refer here and possibly to entries 2 or 4. No specimens have been found in the BM but pinholes above the labels suggest that they have sometime been removed possibly for exhibition purposes: *Stenopteryx hybridalis* Hübner (Walker, 1859: 812) (= *Nomophila noctuella,* see also entry 2); *Asopia vulgalis* Guenée (Walker, 1959: 364) (= *Hedylepta indicata* F., Pyralidae); *Alata anticalis* Walker (1863: 108) (= *Etiella zinckenella* Treitschke, Pyralidae). The last two species are also recorded from the Cape Verde Islands by Viette (1958).

201, 202. Harpalidae Quail Island. St. Jago. [Cape Verde Islands]

No specimens found. Mateu (1964) records 58 species of Carabidae (Coleoptera) from the Cape Verde Islands.

203. Allied to Cryptocus. Do. [Cape Verde Islands]

COLEOPTERA, Tenebrionidae: *Oxycara cribratum* Wollaston, five specimens in the BM (1887–94, error for 1887–42); two specimens in the BM (1845–63). This species looks very like a *Crypticus* (Español & Lindberg, 1963, pl. 5). See also 204.

204. Do. These two insects are found in the greatest profusion under stones, all over St. Jago [Cape Verde Islands]

See entry 203, the habitat described fits perfectly.

205. Allied to Trechus. St. Jago [Cape Verde Islands]

COLEOPTERA, Carabidae: no specimen found. See entries 201, 202.

206. Bee, common, making nest in the rocks. Do. [Cape Verde Islands]

HYMENOPTERA: no specimen found.

208, 209. Hygrotus stream at St. Martin. Do. [Cape Verde Islands]

COLEOPTERA, Dytiscidae: *Hyphidrus maculatus* Babington (1842: 12) (*Hyphydrus*), two specimens in the BM (1863.44) (see Bistrom, 1982 for type designation, redescription and synonymy).

210. Corixa. Do. [Cape Verde Islands]

HEMIPTERA: this may refer to the specimen reported to be in Cambridge which bears an enigmatic white, printed, 41.

211. Lice from head of Gull (185) I observed they continued alive on bird many days after its death. St. Jago [Cape Verde Islands]

In Darwin's *Ornithological Notes* (see Barlow, 1963: 211) entry 185 reads 'These birds were shot in the neighbourhood of Porto Praya from 16th. of Jany. to 7 of Feby. Gull'. No specimens found.

212. Blatta. St. Domingo [Cape Verde Islands]

No specimen found. Chopard (1958) lists 10 species of Blattodea from the Cape Verde Islands.

213. 214. Gyrinus allied to Dineutes MacLeay **(?)Hab Do.** [Cape Verde Islands]
Lost

COLEOPTERA, Gyrinidae: *Dineutes aereus* Klug., one in Cambridge, St Domingo, St Jago Island, Cape Verde Is., with white printed label 214 and small green printed label 44 and Zimmerman det. label.

215. Gyrinus **Do. (?) Hab.** Do.

COLEOPTERA, Gyrinidae: *Dineutes subspinosus* Klug, one in Cambridge, St Domingo, St Jago Island, Cape Verde Is., with white printed label 215 and small green printed label 45 and Zimmerman det. label.

216. 217. 218. Hydrobius stream near St. Domingo [Cape Verde Islands]

COLEOPTERA, Hydrophilidae: *Sternolophus solieri* Castelnau, two in Cambridge, St Domingo, Cape Verde Is., with white printed label 217 and small green printed label 46 and Knisch det. label and one similarly labelled but with white printed label 218.

219. Hydrobius and Gerris. Hab. Do. [Cape Verde Islands]

No specimens found. The only member of the family Gerridae (Hemiptera) recorded from the Cape Verde Islands is *Limnogonus cereiventris* ssp. *leptocerus* Reuter. (see Lindberg, 1958: 127).

225. 226. 227. Ornithomyia (Lat.). Feronia (Leach)

(a) **(a)** [on verso of page] **225 on, from the Booby: frequent: St. Pauls. Feb. 16th.** [St Paul's Rocks]

DIPTERA, Hippoboscidae: *Olfersia aenescens* Thompson (det. A.M. Hutson), two females in BM (1845–81), St Pauls, Atlantic Ocean. These specimens were referred to by Bequaert (1957: 438) but he confused St Paul's Rocks with St Paul Island in the Indian Ocean which led him to comment on the rather high latitude (38°40'S) for this record.

Walker (1849: 1143) recorded this as *'Ornithomyia nigra* ? *Hippobosca nigra* ? Perty' from 'St. Pauls, Brazil' (also as his *O. intertropica* from Galapagos, a synonym, see 3229). Walker probably thought St Pauls was *in* Brazil and did not mean to indicate that there was a second specimen *from* Brazil, or he would have followed his usual practice of giving each locality a suffix letter.

Darwin (1845: 10) refers to these specimens as an *Olfersia* in the *Journal.*

228. Moth. St. Pauls. Feb. 16th.

LEPIDOPTERA. This is recorded in the *Journal* (Darwin, 1845: 10) as 'a small brown moth, belonging to a genus that feeds on feathers'. None of the species described by Walker (1854–66) fits this and the specimen is presumed lost. However, in a recent study of the ecology of St Paul's Rocks (Edwards & Lubbock, 1983; Edwards, 1985) record finding larvae of a small moth amongst the booby nesting material. The species has now been described by Robinson (1983) as *Erechthias darwini* (Tineidae) subfamily Erechthiinae) and since members of this subfamily lack the ability to digest keratin these authors suggest that the larvae of this moth probably feed not on feathers but on dry sea weed in the nesting material.

229. Staphylinus. Do. Bird's dung

COLEOPTERA, Staphylinidae: one *'Staphylinus'* from St Paul's Rocks is entered in the BM Accessions Register under 1845: 81, but the specimen has not been found. However there is a specimen of *Philonthus cliens* Eppelsheim (det. P.M. Hammond), St Paul's Rocks, 8.xi.1921, in guano near bird's nest G.H. Wilkins, No. 81, BM 1922–363, Shackleton-Rowett Expedition. This could be the same species as the *Quedius* mentioned in the *Journal* (Darwin, 1845: 10). If a true *Quedius* were involved Hammond is of the opinion that it is most likely to be the widespread *Q. mesomelinus* (Marsham). *Philonthus cliens* is also known from tropical Africa, Arabia and India (Edwards & Lubbock, 1983; Edwards, 1985). See also entry 708.

231. Oniscus Do.
Lost

Crustacea (woodlouse)—not an insect. See Edwards & Lubbock, (1983); Edwards, (1985).

232. 233. 234. Tics [sic; ? ticks]

Arachnida—not insects. See Edwards & Lubbock, (1983).

304. Termites. Fernando Noronha [between St Paul's Rocks and Brazilian Coast, 3°50′S, 32°25′W]

ISOPTERA: no Darwin termites have been found.

305. Part of their nest (vide Geological Notes)

ISOPTERA: no specimen found.

308. Rhynchites, seeds of the Tamarind, St. Jago, Feb. 7 [Cape Verde Islands]

COLEOPTERA, Curculionidae: the tamarind weevil is *Sitophilus linearis* (Herbst) but no specimen has been located in the BM collections. R.T. Thompson comments that it is strange that Darwin should refer to this weevil as a *Rhynchites*.

325. Numerous single Coleoptera. Hemiptera from Bahia **Brazil.** [Written obliquely across this entry is 'Green 2000' and 'Yellow 300' [sic, error for 3000], clearly referring to the colour coding of labels. See description of labelling of specimens in the section on the British Museum collections.]

COLEOPTERA, Anthicidae: *Acanthinus striatopunctatus* Laporte, one in the BM (1887–42), Bahia.
Buprestidae: *Callimicra darwini* Hespenheid (1980: 15).
Cerambycidae: *Megacera parvula* Newman (1840: 12), one in the BM (1863–44), Bahia.
Chrysomelidae: *Crepidodera bahiensis* Bryant (1942: 103), one in the BM (1885–119).
Coccinellidae: *Diomus brasiliensis* Brèthes (1924: 162), one in the BM (1885–119), Bahia. *Diomus genialis* Brèthes (1924: 166), one in the BM (1885–119), Bahia.
I place these here because they are 'single Coleoptera'; some may refer to 348 or 349, or 3858–3864.

1832 *Insects* *Bahia* *2.*

348. 349. Numerous Coleoptera from Bahia. Part of a couple of hours collecting.

COLEOPTERA, Chrysomelidae: *Ctenispa darwini* Maulik, two in the BM (1887–42 & 1885–119), Bahia, which I place here rather than under entry 325 as there are two specimens.

Coccinellidae: *Chnoodes terminalis* Mulsant, *Hyperaspis festiva* Mulsant and *Solanophila rufoventris* Mulsant are all recorded from Darwin material by Brèthes (1925*b*). Also some unidentified coccinellids (BM 1887–94) [an error for 1887–42] and (1858–60) Bahia, may refer here.

351. Onthophilus perceiving the smell of human dung with singular quickness. **Do.**

COLEOPTERA, Scarabaeidae; *Ganthidium ruficolle* Germar, one in the BM (1887–42), Bahia, with printed label 351. See also entry 354.

352. Elater nortelucus [sic ? noctilucus] vide **p.** 25

COLEOPTERA, Elateridae: named in the *Journal* (Darwin 1845: 31) as *Pyrophorus luminosus* Illiger, 'seems the most common luminous insect' and its jumping habits are discussed with a reference to Kirby's *Entomology,* vol. ii, p. 317 (Kirby & Spence, 1818: 317). There is a very similar discussion in the *Zoological Diary* to which the page citation refers. No specimen has been found.

353. Cimex, drove its proboscis deeply into my finger. Do.

HEMIPTERA, Coreidae: *Vilga westwoodi* (Kolenati). Dolling (1977) records a Darwin specimen, female, Bahia, Brazil, ii or iii, 1832 in the British Museum. Though at first somewhat unlikely this is the only bug I can allocate to this entry. Most plant bugs have piercing mouthparts and several genera are recorded as piercing human skin. The term *'Cimex'* was loosely applied in Darwin's day and it may well be that this is the specimen Darwin alludes to. For the true skin piercing Triatomid bugs see entries 2913 & 3423 and for other 'Cimex' see entries 431 & 874.

354. Geotrupes. Bahia. Feb. 7.

COLEOPTERA, Scarabaeidae: *Trichillum heydeni* Harold, one in BM (1885–119), Bahia. *Ataenius* sp., one in BM (1887–42). These and 351 are the only Scarabaeids I can find from Bahia.

355. Acarus from Do.

Arachnida. Acari—not an insect.

356. Louse from Vespertilio **(in spirits)**

There are no lice on bats. From the possible hosts it was probably a bat fly (Streblidae or Nycteribiidae) but no specimens have been found. Possible hosts are two bats described in the *Zoology* (Darwin, 1838: pt. 2, 3–5) *Phyllostoma grayi* Waterhouse (G.R.) from Pernambuco (5° north of Bahia) and *Phyllostoma perspicillatum* Geoffroy from Bahia (lat. 13°S). These two names are synonymized in modern literature under *Carollia perspicillatum.*

357. 358. Specimens from an enormous migration of Ants. vide page 28.

HYMENOPTERA, Formicidae: no specimens found, but the entry in the *Journal* (Darwin, 1845: 35) indicates that they were 'driver ants' (subfamily Dorylinae), probably of the genus *Eciton.* The page reference is to the *Zoological Diary* from which the *Journal* account is taken. 'Spiders, Blatta and other insects' were flushed by the ants.

359. 360, 361, 362, 363, 364. A very common species of Ant; the winged ones were flying in numbers from the nest.

HYMENOPTERA, Formicidae: no specimens found.

365. 366. Feb. Hymenopterous insects

No specimens found.

367. Nest of Do. when large and complete is globular.

No specimen found.

368. Curious habitation of some insect on a root in a sand bank. May 1st. Have found out it belongs to some **Hymenopterous insects.**

No specimen found. This could belong to the wasp family Eumenidae. See also entries 449, 536, 537.

386. Mantis: caught at Bahia on the 17th of March a mantis and as I thought killed it, by holding for several minutes under water that was boiling, the head and thorax (to the insertion of the

wings) and anterior legs. These parts shortly were completely dead, and became dry and brittle, but eight days afterwards on the 25th the abdomen and hinder legs continued to possess a slight degree of irritability. This appears a well marked instance of the tenacity [continued]

1832 *Insects* *3.*

[continued] of life among insects.

MANTODEA: no specimen found. For further Bahia entries see 3858.

387. Butterfly very common, on main island of Abrolhos March 29th

LEPIDOPTERA: no specimens found.

388. Helops Do.

COLEOPTERA, Tenebrionidae: no specimen found.

389. **Ornithomya** nearly all the birds in **this** island were Totipalmes; yet this insect, I think differs from those taken at St. Pauls from the bodies of a Sula. Abrolhos. March 29th.

DIPTERA, Hippoboscidae: the only record of a Hippoboscid I have been able to trace from these islands is that cited in Bequaert (1957: 43) of *Olfersia spinifera* (Leach) '3 miles off Abrolhos Is., coast of Bahia, 18°S (Albatros Exped.—Recorded by Howard, 1890)'. This species is normally associated with frigate birds. There are no birds recorded from Albrolhos by Darwin in the *Ornithological notes* (Barlow, 1963) nor in the *Zoology* (Darwin, 1841), where Darwin's only mention of the frigate bird is on Galapagos and Ascension (op. cit., pt. 3, p. 146). However in his *Diary* (Barlow, 1933: 46) he says 'Two parties landed directly after breakfast. I commenced an attack on the rocks & insects & plants: the rest began a more bloody one on the birds. Of these an enormous number were slaughtered by sticks, stones & guns; indeed there were more killed than the boats could hold'. Fitzroy (1839: 66) in his account of Abrolhos described what is without doubt a frigate bird 'A large black bird, with a pouch like that of a Pelican, but of a bright red colour, was very remarkable as it hovered, or darted among the bright verdure, and at a distance looked handsome; but when seen close it at once descended to the level of a carrion-eating cormorant or buzzard.' Darwin's reference to Totipalmes is an old group name for pelicans, cormorants and frigate birds.

Whilst studying the photographs of Darwin's insects *in situ* in Dublin I noticed a printed label 389 and pinned with it a label 'Hippobosca' suggesting that a specimen had been removed sometime but was not among those sent to me. Dr James O'Connor made a diligent search and found a Hippoboscid bearing a Haliday collection printed label which almost certainly refers here as it has proved to be *Olfersia spinifera* (det. A.M. Hutson) and was probably moved from Haliday box 566 by E.O. Mahoney, the ectoparasite specialist.

Rio de Janeiro [inserted under a line ruled across the page]

414. Coleoptera from the neighbourhood of the Rio Macae. April.

No specimen found. See entry 460.

415. Coleoptera. Rio de Janeiro. April.

Carabidae: Bembidiini subtribe Tachyina, three unidentified specimens in the BM (1887–42), Rio, one numbered 415.

Melyridae: *Astylus lineatus* F. (Champion, 1918c) may refer here.

Scaphidiidae: *Scaphisoma elongatum* Waterhouse, F.H. (1879: 533). One in the BM (1879–34), Rio and numbered 415.

Scarabaeidae: *Aphengium sordidum* Harold. Two in the BM (1887–42), Rio, numbered 415. *Ateuchus squalidum* F. Four in the BM (1887–42 and 1885–119).

The following Scarabaeidae are referred here although unnumbered:
Canthidium trinodosum Boheman. Two in the BM (1887–42), Rio.
Onthophagus haematopus Harold. One in the BM (1887–42), Rio.
Saprosites aspericeps Harold. One in the BM (1887–42), Rio.
For other Scarabaeidae from Rio see entries 457, 458 & 568.

416. 417. Cicindela from the woods, Locégo. Do. [Rio de Janeiro]

COLEOPTERA, Carabidae, Cicindelinae: no tiger beetles have been found. See also entries 416–7, 486, 504–5, 552, 1712, 2841, & 3420.

418. Carabidae, from Rio Frade. Do. [Rio de Janeiro]

COLEOPTERA, Carabidae, Bembidiini: *Trichiolopha braziliensis* Waterhouse, one in the BM (1887–42), Rio, so labelled presumably refers to *braziliensis* Sahlberg (*Tachys*). There are also three unidentified Harpalinae in the BM (1887–42) that could refer here.

420. 421. Colymbetes. small puddles. Locégo. Do. [Rio de Janeiro]

COLEOPTERA, Dytiscidae: *Colymbetes calidus* Babington (1842: 9), two in the BM, Rio [now in *Copelatus*]. *C. elegans* Babington (1842: 11), one in the BM (1863–44), Rio [now = *Copelatus posticatus* F.].

422. 423. Diptera. Rio Macãe. Do. [Rio de Janeiro]

Tabanidae: *Chrysops varians* Wiedemann. One in Dublin with printed label 422 (det. J. E. Chainey).

424. 425. 426. Blattae under bark of rotten tree at Locégo. Do. [Rio de Janeiro]

BLATTODEA: no specimens found. See entry 647.

427. Blaps. Emitted a musky, together with the usual disagreeable smell, stained my fingers for some days of a purplish red colour. Locégo. April. [Rio de Janeiro]

COLEOPTERA, Tenebrionidae: no specimen found.

428. Blaps. ——— Do. [Rio de Janeiro]

COLEOPTERA, Tenebrionidae: no specimens found.

429. Do. ——— Do. [Rio de Janeiro]

COLEOPTERA, Tenebrionidae: no specimens found.

430. Erotylus. Locégo. ——— Do. [Rio de Janeiro]

COLEOPTERA, Erotylidae: *Morphoides immaculatus* Lacordaire, one in the BM (1887–42).

431. Cimex. Rio de Janeiro

HEMIPTERA: no specimen found.

432. 433. Gyrini. Campos Novos R. de Janeiro. Do.

COLEOPTERA, Gyrinidae: *Gyrinus ovatus* Aubé, two specimens in Cambridge with above data; one has a printed white label 432 plus a small green label 50, the other has a small green label 22.

Other Darwin gyrinids in Cambridge may refer here: *Gyrinus parcus* Say. One with green label 39; *Macrogyrus ellipticus* Brullé. Nine with green label 33.

434. Diptera. Mandetiba — Do. Do. [Rio de Janeiro]

Stratiomyidae: *Chordonota ? inermis* Wiedemann (det. J.F. Chainey), one in Dublin labelled 'Clitellaria atrata' and numbered 434.

438. Coleoptera. Botafogo May [Rio de Janeiro]

Carabidae, Bembidiini, subtribe Tachyina: two in the BM (1887–42), Rio, numbered 438.

Hydrophilidae: *Enochrus atomus* d'Orchymont, one in the BM (1858–60), Rio, is numbered 438 and two others (1885–119, 1858–60) are unnumbered.

Lampyridae: *Apisoma hesperum L.*, two in the BM (1887–42 and 1858–60), one numbered 438.

Limnichidae: *Phalacrichus atomarius* Sharp, several specimens in the BM (1885–119 and 1858–60) are numbered 438.

See also entry 460.

439. Diptera—May—Do. Causing intolerable itching [Rio de Janeiro]

Muscidae: *Musca domestica* L. (det. A.C. Pont). One in Dublin numbered 439.

While the House-Fly can function as a sweat-fly in the tropics there appears to be nothing in the literature recording a reaction of this sort.

440. Lampyris. vide **P** 41 May [Rio de Janeiro]

COLEOPTERA, Lampyridae (Glow worms and fire flies): in the *Journal* (Darwin, 1845: 30) identified [by Waterhouse] as mostly 'Lampyris occidentalis' (= *Photuris fulvipes* Blanchard). No Darwin specimens found. The page reference is to the *Zoological Diary* where observations on the light flashes, etc. are recorded on which the *Journal* (p. 30) account is based; also mentioned in the *Descent* (Darwin, 1871: vol. 1, 345).

See also entries 438, 551.

441. Do. Do. [Rio de Janeiro]

No specimen found.

442. Females of this insect and Larva Do. [Rio de Janeiro]

No specimens found.

443. Do. luminous vide **P** 42 Do. [Rio de Janeiro]

No specimens found. The page reference is to the *Zoological Diary* entry, see 440.

444. Lopha (?) taken in great numbers on sand walk. [continued]

1832 *Insects* *4.*

[continued] at night [Rio de Janeiro]

COLEOPTERA, Carabidae, Bembidiini, subtribe Tachyina: one unidentified in the BM (1887–42), Rio, with white printed label 444.

445. Coleoptera — — Do. [Rio de Janeiro]

Carabidae: Harpalinae, four unidentified in the BM (1887–42), Rio, each labelled 445.

Carabidae, Bembidiini, subtribe Tachyina: fourteen unidentified in the BM (1878–43), Rio, only two numbered 445 but obviously the same series.

Curculionidae: *Endalus* sp. (det. R.T. Thompson), two in the BM (1887–42), Rio, one numbered 445.

See also entry 460.

446. Fresh water Coleoptera — — Do. [Rio de Janeiro]

I place here all those Hydrophilidae in Cambridge labelled 'South America' and not otherwise accounted for (see entries 448, 1505, 3528 and 3635) and those Dytiscidae described from Rio and unplaced elsewhere.

Hydrophilidae: *Berosus sticticus* Boheman ab. *aberrans* Knisch. One in Cambridge with green number 16, a six mount with three specimens present with green number 15, one numbered green 7, one numbered green 23 and a double mount numbered green 31. *B. sticticus* ab. *confinis* Knisch. One double mount numbered green 33, an eleven mount (9 present) numbered green 25, a nine mount (6 present) numbered green 24, a six mount (3 present) numbered green 15 and a five mount (4 present) numbered green 3. *B. reticulatus* Knisch. Ten numbered 17. *Derallus rudis* Sharp. A four mount (2 present) numbered green 13; one numbered 12. *Helobata striata* Brullé. Two numbered 20. *Neohydrophilus politus* Castelnau. One numbered 49. *Paracymus debilis* Sharp. Three numbered 11. *P. armatus* Sharp. Five numbered 8, 10, 27, 28, 32. *Tropisternus collaris* F. Ten, one of which is numbered 4. *T. lateralis* F. Three without numbers. *T. setiger* Germar. Eleven, two numbered 37, 38. *T. laevis* Sturm. Five, two numbered 1, 2. *T. nitidulus* Knisch. One numbered 51.

Most of the above have the determination labels of A. Knisch, 1922 and the numbers cited are all on green labels (see introductory section on Cambridge material).

Dytiscidae: *Hydaticus havaniensis* Laporte (Babington, 1842: 11). *Hydroporus obscurus* Babington (1842: 14) is synonymous with *H. nitidus* Babington (1842: 14) and now placed in *Bidessus* (Blackwelder, 1944). *Hydroporomorpha parallela* Babington (1842: 14, 15). Two in the BM (1863–44) (= *Celina*). See Fig. 12. *Anodochilus maculatus* Babington (1842: 15, 16). One specimen without accession number. See Fig. 13. *Desmopachria nitida* Babington (1842: 16, 17). Two in the BM (1863–44). See Fig. 13.

See also entries 530, 531.

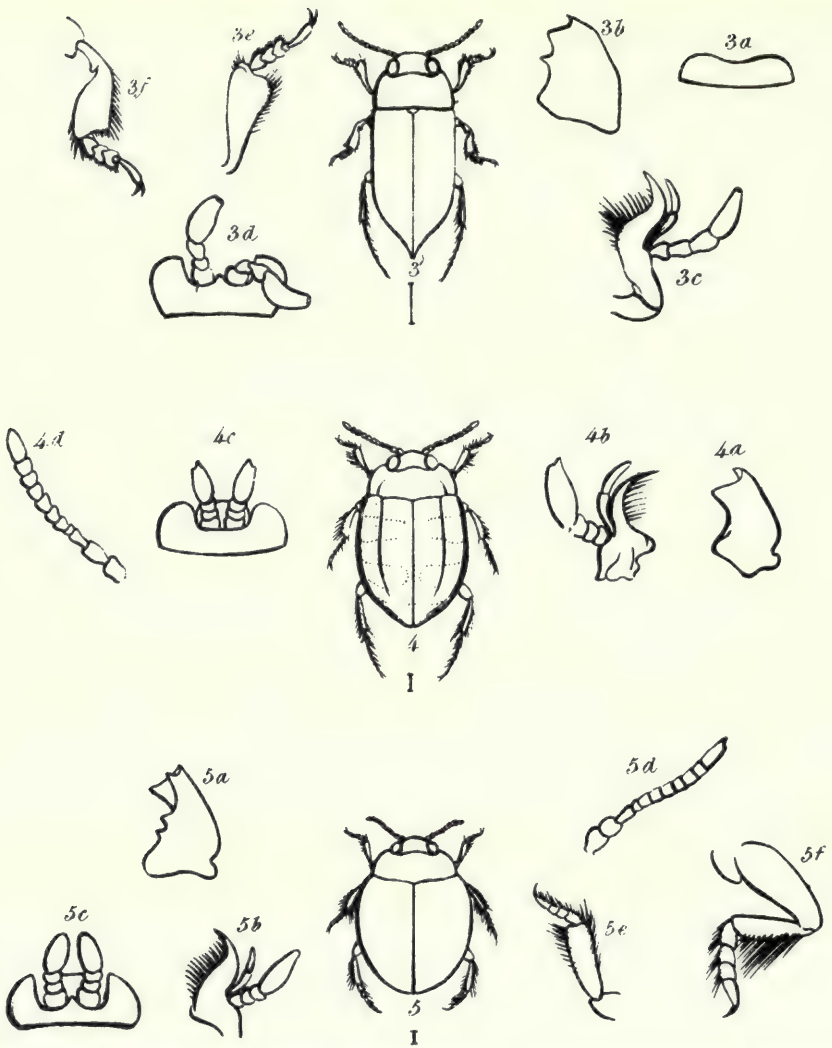


Fig. 13 Part of the plate from Babington's paper 'Dytiscidae Darwinianae' depicting new water-beetles from Rio de Janeiro: 3, *Hydroporomorpha parallela*; 4, *Anodochilus maculatus*; 5, *Desmopachria nitida* (see *Insect Notes* 446) (by courtesy of the Royal Entomological Society of London, from their *Transactions*, 1842).

447. Hydrobius inhabiting, **strongly brackish** lagoon, (road to Botanical Garden) R. de Janeiro **Lost** May.

COLEOPTERA, Hydrophilidae.

448. Hydrophilus, together with the last Do. Do.

COLEOPTERA, Hydrophilidae: in the *Journal* Darwin (1845: 22) says 'I also frequently encountered in the lagoon near the Botanic Garden, where the water is only a little less salt than the sea, a species of *Hydrophilus*, very similar to a water beetle common in the ditches of England.' The last comment would fit several genera of Hydrophilidae, but the 'Hydrophilus' could refer to a specimen of *Hydrous ater* Olivier (A.G.) present in Cambridge.

See entry 1305 also for this genus and entry 446 for other freshwater beetles.

449. Ants found in (I do not know whether making) a nest like (368) found at Bahia. Ants do not make it. I found one somewhat similar, filled with half dead spiders, evidently collected by some Hymenopterous insect; It is the case; vide No 536. Rio de Janeiro. May.

The nests probably belong to wasps of the family Sphecidae but no specimens have been found (of ants or wasps). Further comment in the *Journal* (Darwin 1845: 35) includes reference to nests with dead caterpillars as well and probably involves several genera or families of wasps. See also entries 368, 536.

450. Ricinus from a pretty, but common yellow Certhia Do. Do.

PHTHIRAPTERA: no specimen found.

Darwin used *Certhia* loosely and Dr D.W. Snow (in litt.) is of the opinion that the host was probably the very common Bananaquit (*Coereba flaveola* L.) which has the right kind of bill and is yellow underneath. About 40 races of this species are recognized. See also entry 638 in spirits of wine list.

451. Ricinus Do. Do. (another species) Do. Do.

PHTHIRAPTERA: see entry 450.

453. Insect, colour changed by boiling water from grass green into a yellow Do. Do.
Lost

454. Do. Do. Do. Do.
Lost

456. Lampyris, different species from (440); shines nearly as brightly; uncommon; caught in web of small Epeira.

COLEOPTERA. Lampyridae: no specimen found. See White (1841) for the spider.

457. 458. Geotrupes; collect human dung into balls, and push it along with hind legs. Do.

COLEOPTERA, Scarabaeidae: *Goniocanthon smaragdulus* F., two in the BM (1887–42) with printed labels 457, 458.

459. Acarus from a Passalus in very moist rotten wood Do. Do.
Lost

Arachnida—not an insect

460. Curculio nearly covered with Acari liropodes Lat.[a] in very moist rotten wood. Do. Do.

COLEOPTERA, Curculionidae; the only Rio weevils which remain unassigned elsewhere are three Beridinae, BM (1887–42), probably representing three different genera (*teste* R. T. Thompson). However none bear mites and do not fit well here in habits and may therefore be referable to one of the general Coleoptera entries (414, 415, 438, 445, 478, etc.).

462. Hymenoptera the most common species, in great numbers Do. Do.

Chalcididae: *Smiera pielus* Walker (1838: 470), now placed in *Spilochalcis*, a genus with many species known to be gregarious parasites of Lepidoptera or Diptera.

476. 477. Curculio with Acari Do. Do.

See comments under entry 460.

478. Numerous Coleoptera Do. Do.

See comments under entry 460.

479. Beetle exceedingly numerous on sandy plain near the sea Do. Do.

COLEOPTERA, Oedomeridae: four unidentified specimens in the BM, one (1887–42), with printed number 479; the others (2, 1887–94 [error for 1887–42], 1, 1885–119) without numbers.

480. Beetle. Sandy plain. R. de Janeiro. May.

COLEOPTERA: see entry 479.

482. Hymenop: was conveying off a large Mygalus; they seem to **prey on &** kill large spiders. N.B. The only two Mygali, I have yet caught were in the jaws of this insect. Do. Do.

No specimen found. Possibly Pompilidae; my colleague M. C. Day suggests *Pepsis* or *Entypus*.

483. Bee, the most frequent sort Do. Do.

HYMENOPTERA: no specimen found.

484. Diptera, vibrates its wings as its congeners do in England. Do. Do.

Otitidae: ?*Euxesta* sp. (det. B. H. Cogan). There are three specimens (standing together) in Dublin, one of which bears a printed number 484.

485. Diptera, runs swiftly **laterally** Do. Do.

No specimen found.

486. Cicindela, woods on Caucovado [Mt. Corcovado, Rio de Janeiro] Do. Do.

COLEOPTERA, Carabidae, Cicindelinae: no specimen found, see entry 416 note.

487. Capsida, Caucovado [Mt. Corcovado], as the Capsida was found on the larva, they most probably belong to it. The larva were curiously placed in two groups heads to heads round a stick. They adhered by the remains of a capsule and each group was thickly imbricate.

HEMIPTERA—Heteroptera: no specimen found.

488. 489. 490. Larva of Do. Do. Do. Do.

HEMIPTERA—Heteroptera: no specimen found.

491. Coleoptera Do. Do.

Tenebrionidae. *Crypticus platensis* Fairmaire, one in the BM (1885–119), 'Rio' (see also 677, 1321) and one *Crypticus* sp. (BM. 1887–42), 'Rio', may refer here.

492. Cerambyx, with Acari, by the friction of the thorax it made a most extraordinary noise Do. Do.

COLEOPTERA, Cerambycidae: no specimen found.

493. Diptera, very summit of Caucovado [Mt. Corcovado, Rio de Janeiro] Do.

Tabanidae: *Scaptia ?seminigra* Ricardo, one specimen in Dublin with the printed number 493 and a handwritten capital B. I have seen no explanation of the B (in Darwin's hand, see Fig. 19) label, which may merely be connected with initial sorting of material by Darwin.

494. Diptera. hovered over sandbank, like a Bombylius Do. Do.

Bombyliidae: *Anthrax ?reperta* Walker (det. J. E. Chainey), one in Dublin with printed number 494.

501. Diptera. This is the insect called sand fly, and notorious even **in** Anson's voyage, from the painful bite, which causes swelling, that lasts for many days; in centre a circular red mark is visible; the pain is half itching and half aching. Do. Do.

Simuliidae: one specimen in Dublin with printed number 501. My colleague Dr A. J. Shelley has dissected this very poor specimen and identified it as *Simulium ?pertinax* (Kollar). *S. pertinax* is the most common man-biter in that area and is considered in detail by Andretta & Andretta (1950). Simuliidae are referred to as black flies in modern parlance and the name sand fly is nowadays restricted to the biting subfamily Phlebotominae of the family Psychodidae.

Anson's (1748) 'sandfly' encountered at St Catherine's, Brazil is recorded as follows: '... at sunset, when the muscatos retired they were succeeded by an infinity of sand-flies, which, though scarce discernible to the naked eye, make a mighty buzzing, and, wherever they bite, raise a small bump in the flesh which is soon attended with a painful itching, like that arising from the bite of an English harvest bug.'

The size is suggestive of a ceratopogonid midge of the genus *Culicoides* but the buzzing not—unless they were in very large numbers—perhaps he heard the last of the mosquitoes but was bitten by the first of the *Culicoides*. An American name for these tiny midges is appropriately 'no see ums'. John Boorman of the Animal Virus Research Institute suggests that Anson's midge may be *Culicoides paraensis* Goeldi which is the principal man-biting *Culicoides* in that area of Brazil, though the buzzing remains a mystery.

502. Xenos (??) Sandy Plain; sweeping; Do. Do.

COLEOPTERA, Stylopoidea (=Strepsiptera or 'stylops'): no specimen found.

503. Libellula, I observed this insect as it proceeded along the edge of a pool, strike [continued]

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[continued] the water violently with its curved tail, so as to throw some **drops** several inches on the bank; is this connected with **oviposition.**

ODONATA. Libellula was used rather indiscriminately and simply meant dragonfly in Darwin's day. The oviposition habits described suggest one of the larger Anisoptera but no specimen has been found.

504. 505. Cicindela, habits precisely the same as Cicin: hybrida Do. Do.

COLEOPTERA, Carabidae, Cicindelinae: no tiger beetles have been found; the species referred to is British.

506. 507. The larvae or female of Lampyrus v p. 42 Do.

COLEOPTERA: no specimen found. The page reference is to the *Zoological Diary*. See entries 438, 440–443, 551 for further comments.

508. Do; another species: all luminous Do.

No specimen found. See entries 438, 440–443, 551.

509. 510. 511. 512. 513. Coleoptera from the very summit of Caucovado [Mt. Corcovado] **Lost Lost Lost Lost** Do. Do.

No specimen found.

514. Coleoptera habits Do. Do. Do.

No specimen found.

515. 516. Hemiptera habits Do. Do. Do.

No specimen found.

517. 518. 519. 520. Diptera habits Do. Do. Do.

Bibionidae: one numbered 517 in Dublin.
Lauxaniidae: two with printed numbers 518, 520 in Dublin.

529. Coleoptera. living in the water or caught in my **water** net. Do. Do.

Scarabaeidae: *Ataenius picinus* Harold, one in BM (1885–119), Rio, numbered 529. *Ataenius* sp., one specimen in BM labelled ex series *tenebricosa* and six more numbered 529.

530. 531. Insects New genus, habits the same as Elmis, living under stones in running water; differs remarkably from that genus in shape of body, and palpi (and in spear to sternum?) Do. Do.

COLEOPTERA, Psephenidae: *Psephenus darwinii* Waterhouse, C.O. (1880: 563) one in BM, 'Rio de Janeiro', with printed number 530. Waterhouse later (1880–82, plate 26) illustrated this species in colour.

532. 533. Diptera plague the horses terribly Do.

Muscidae: *Stomoxys calcitrans* (L.) (det. A. C. Pont) (the Stable Fly), two specimens numbered 532, 533 in Dublin.

534. Hymenoptera. Pompilus (?) This family runs very quickly amongst the herbage, continually at the same time vibrating its wings. Excavates **cylindrical** holes in a trodden path. Do.

No specimen found. Could refer to Pompilidae or Sphecidae.

535. Hymenoptera caught killing spiders. v [p.] 39. Do.

No specimen found. Referred to as ? Pepsis in the *Journal* (1845: 34–5) where full observations are recorded. My colleague M. C. Day tells me that this could be a *Trypoxylon* (Sphecidae). The page reference is to the *Zoological Diary* where the observations are recorded on which the *Journal* account is based.

Some of Darwin's spiders were reported on by White (1841, 1849) and there is unidentified material both dry and in spirit in the Zoology Department at the BM.

536. Hymenoptera. I observed this insect carrying a large green caterpillar, and watched it to the cell (537): when with its mandibles, by degrees it forced the caterpillar inside. The rim of the cell is broken; this is the same as (368) found at Bahia.

No specimen found. My colleague Colin Vardy suggests a wasp of the family Eumenidae, possibly *Zeta* sp. See entries 365–8, 449, 537.

537. Cell made by the latter for its larva (May).

No specimen found.

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538. **Orthopterous insect** with Acari Do. Do.

No specimen found.

550. Leiodes from Hymenophallus vide [p.] 43.

COLEOPTERA, Nitidulidae: one unidentified specimen in BM (1885–119), Rio, with printed number 550 (*?Oxycnemis* det. R. W. Aldridge).

Leiodes is not a Nitidulid but is now placed in Leiodidae.

In the *Journal* Darwin (1845: 33) records that a *Strongylus* [Nitidulidae], attracted by the odour, alighted on the fungus as he carried it in his hand. In a postscript to a letter to Henslow 16 June 1832 (Barlow 1967: 57) he says:

'I found the other day a beautiful *Hymenophallus* (but I broke it to pieces in bringing it home) and with it an accompanying Leiodes.—almost perfect copy of the Barmouth specimen.—'

The Barmouth specimen referred to must be one of the 'Nitidula' species referred to by Stephens (1827) and discussed in the section on British insects, but is larger.

The fungi collected on the *Beagle* voyage were described by Berkeley (1839, 1842) but do not include a *Hymenophallus* so presumably there was not enough of the specimen left to warrant preservation. The page reference is to the *Zoological Diary* where Darwin says of the fungus 'resembling impudicus' [*Phallus*] with other descriptive details.

551. Beetle from the dense forest Do. Do.

Lampyridae: *Ethra maledicta* Olivier. (=*lateralis* Laporte), one in BM (1887–42) with printed number 551.

552. Cicindela from the forest Do. June.

COLEOPTERA, Carabidae: Cicindelinae: no specimen found.

553. Forficula from Do. (forceps curious). Do.

DERMAPTERA: *Sphingolabis perplexa* Kirby (1891: 529), one in BM (1885–100), Rio (now placed in *Kleter*).

554. 555: Gyrini. rapid brook in the forest; emit an odour like G. natator Do. Do.

COLEOPTERA, Gyrinidae: *Enhydrus sulcatus* Wiedemann, two specimens in Cambridge with this data and printed white labels 554 and 555. One has a small green printed label 48 and there are three other specimens with printed Museum labels. The species referred to in the note is British.

564. Larva of Lampyrus, highly luminous Do.

COLEOPTERA, Lampyridae: no specimen found. See entries 440–443 and 506–8.

565. Aphodius the only species I have yet seen in Brazil Do. Do.
Lost

COLEOPTERA, Scarabaeidae: no specimen found.

566. Agrion from the forest; common. Do. Do.

ODONATA, Zygoptera: no specimen found.

567. Frigania. Do. Do. Do.

TRICHOPTERA[Phryganea]: no specimen found.

568. Geotrupes Do. Do. Do.

COLEOPTERA, Scarabaeidae: *Chalcocopris hesperus* Olivier, one in BM (1887–42), Rio, with printed label 568.

569. Diptera common Do Do. Do.

Micropezidae: two specimens in Dublin with printed numbers 569.

570. Dipter[a] called sand fly, caught whilst inflicting its painful bite on the knuckle, its favourite place Do. Do.

?Simuliidae: no specimen found but this sounds like a *Simulium* (see entry 501).

571. Curculio. covered with yellow down, when first taken Do. Do.

COLEOPTERA, Curculionidae: no specimen found but my colleague R. T. Thompson suggests this was probably a *Lixus* or allied weevil genus.

572. Onthophilus. Inhabits the forest in plenty and does not, I suppose, feed on dung.

COLEOPTERA: *Onthophilus* is a Histerid but see entry 351 where a numbered Scarabaeid is referred to this genus. One of the unnumbered Scarabaeids referred to 415 may therefore refer here.

573. Gyrinus, brooks in the forest. Do. Do.

COLEOPTERA, Gyrinidae: *Gyretes glabratus* Règimbart, one in Cambridge labelled with above data and with printed white label 573 (no small green label) and Zimmerman det. label.

574. Coleoptera. Do. Do.

See entry 618.

580. Tricoptera (Stephens) allied to in Fungus in forest, the smallest beetle I have seen in **the** tropics. Do. Do.

COLEOPTERA, Ptiliidae: *Trichopteryx darwinii* Matthews (1889: 193), one in BM (no accession number) labelled 'In fungus in the forest Rio de Janeiro' and a printed number 580. See eponyms.

592. Bee (Social) Burrows its nest in the ground in the forest, projecting tube, with folding edges, leading to its nest. Do. Do.

HYMENOPTERA, Apidae: no specimen found but my colleague G. R. Else suggests possibly a genus of the tribe Meliponini such as *Melipona* or *Trigona*.

593. Lampyrus [sic], abdominal rings shining. Do.

COLEOPTERA, Lampyridae: no specimen found. See entries 440–443, 506–8.

594. Curculio (diamond) feigns death to a remarkable degree; is this to compensate for greater danger brought on by brilliancy of colours. Do. Do.

COLEOPTERA, Curculionidae: no specimen found but my colleague R. T. Thompson has suggested that this would be an *Entimus* species, possibly *imperialis* Forster or *nobilis* Olivier. Darwin (1871: 367) briefly mentions these beetles in the *Descent* 'other species [of beetles] are ornamented with gorgeous metallic tints,—for instance, . . . the splendid diamond-beetles which are protected by an extremely hard covering.'

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615. Butterfly vide 155. Do. Do.

LEPIDOPTERA: no specimen found. In the *Journal,* Darwin (1845: 33) mentions *'Papilio feronia'* as frequenting the orange groves and draws attention to Doubleday's (1845, *Proc. ent. Soc. Lond.*: 123) account of the sound producing mechanism of this butterfly—'. . . had recently examined *Peridromia Feronia,* the butterfly described by Mr C. Darwin, in his 'Tour', as making a noise during flight like the rustling of parchment, and that he had detected a small membranous sac at the base of the fore-wings, with a structure along the subcostal nervure like an Archimedean screw or diaphragm in the tracheae, especially at the dilated base of the wing.'

618. Coleoptera. Do. Do.

I regard this entry as the day to which Darwin (1845: 34) refers in a footnote in the *Journal*:

'I may mention as a common instance of one day's (June 23rd) collecting, when I was not attending particularly to the Coleoptera, that I caught sixty-eight species of that order. Among these were only two of the Carabidae, four Brachyelytra, fifteen Rhyncophora, and fourteen of the Chrysomelidae. Thirty-seven species of Arachnidae, which I brought home, will be sufficient to prove that I was not paying overmuch attention to the generally favoured order of Coleoptera.'

Anthicidae: *Acanthinus aequinoctalis* Laporte, one in BM 1887–42), Rio.

Carabidae: Bembidiini subtribe Tachyina (det. N. E. Stork): one in BM (1887–42), Rio, numbered 618.

Chrysomelidae: *Cephaloleia picta* Baly (1858: 55), one in BM (1885–119), Rio. *Diabrotica bilineata* Baly, one in BM (1885–119), Rio. *D. contigua* Baly, one in BM (1885–119), Rio. *Epitrix* spp., six in BM (3—Rio, 1855–119, one numbered 618; 2 ex Ent. Soc., Rio 1856: 86, one numbered 618).

Coccinellidae: *Diomus effusus* Brèthes (1924: 165), one in BM (1885–119), Rio, numbered 618. *Heterodiomus darwini* Brèthes (1924 gen. & sp.: 155), one in BM (1885–119), Rio. *Pullus caseyi* Brèthes (1924: 171) (subgenus of *Scymnus*), one in BM (1885–119). *P. hians* Brèthes (1924: 171), one in BM (1885–119). *Scymnus* spp., two in BM (1985–119). *Syphrea bahiensis* Bryant (1942: 107) may refer here (see also entry 3858).

Curculionidae: Leptopiinae, three species of an undetermined genus, in BM, Rio, two numbered 618.

Endomychidae: *Stenotarsus areolus* Gerstaecker, one in BM (1887–42), Rio. *Stenotarsus* sp.; one in BM (1887–42), Rio.

Languridae: two in BM (1885–119), Rio, with 618 on verso.

Leiodidae: *Adelopsis grouvellei* Jeannel (1936: 64, 66), one in BM (1885–119), Rio, numbered 618.

Nitidulidae: ?*Pallodes* sp., one in BM (1887–42), Rio, numbered 618. *Stelidota* sp., one in BM (1885–119) numbered 618 and another ex Sharp collection (1905–313) with a Darwin handwritten Rio label and numbered 618 showing that some Darwin specimens were in the Sharp collection.

Scarabaeidae: *Canthon* sp., two in the BM (1887–42), Rio, numbered 618.

Obviously not all the material has been located.

Some of the unnumbered specimens may refer to 574.

630. Coleoptera taken in Beagle between Rio de Janeiro and Monte Video Do.

Bruchidae: *Zabrotes subfasciatus* Boheman, one in BM (1858–60) with handwritten (Darwin) 'Rio' and numbered 630 on verso. This beetle is a pest of haricot beans which were probably carried on board. It occurs in central and South America and elsewhere (Aitken, 1975). It may have been on the Calavances (see 778). In the *Journal* Darwin (1845: 158–9) discusses insects at sea at some length but makes no specific reference to this and the next five entries suggesting they were all possibly 'ships fauna'.

631. Cloporta [sic—Coleoptera] **Beagle** Do.

No specimen found. See entry 630.

632. Meligethes. Beagle, common come from the ripe fruit of the Banana Do.

COLEOPTERA, Nitidulidae. No specimen found.

633. Acrydium. Rio de Janeiro. Do.

ORTHOPTERA: the only 'Acridium' found were described by Walker from Monte Video and may refer here if in fact they were taken on board the *Beagle* between Rio and Monte Video as the previous and following entries suggest (see entry 630).

Acrididae: *Acridium sellatum* Walker (1870: 585), one in the BM (1845–68) (= *Schistocerca gregaria* Forskål, the desert locust). *Acridium maculiferum* Walker (1870: 622), one in the BM (1845–68). *Eynisacris extranea* Walker (1870: 639), one in the BM (1845–68) (now in *Diponthus*).

It seems possible that some mislabelling has occurred and that some of these refer elsewhere; see entries 1329, 1330, 3152.

634. Lampyrus Do. Do. Do.

COLEOPTERA, Lampyridae: no specimen found. See entries 440–443, 506–508.

635. Diptera. Beagle. Do.

No specimen found, unless any of 646 refer here.

636. Lepidoptera. **diurna** Rio de Janeiro. Do.

No specimen found.

637. 638. Moths Do. Do.

No Darwin Lepidoptera have been described specifically from Rio but *Leucania extranea* Guenée (Walker, 1856: 93) (now *Mythimna (Pseudaletia) unipuncta* Haworth, Noctuidae) and *Calonota helymus* Boisduval (Walker, 1856: 1627) (now *Calanotos helymus* Cramer, Ctenuchidae) recorded from 'South America. C. Darwin' may refer here though no specimens have been found in the collections.

640. Colymbetes, taken on board must have at least flown 45 miles from Cape St. Mary. [Monte Video—crossed out] **R. Plata** [substituted by Darwin] (July).

COLEOPTERA, Dytiscidae: *Colymbetes signatus* Babington (1842: 7), one in the BM (1863–44), Monte Video, may refer here. Darwin mentions this in the *Origin* (1859) and asks 'how much further it might have flown with a favouring gale'. See also entry 862.

641. 642. 643. 644. Gnats, in same situation as last in great numbers Do. Do.
Lost **Lost**

DIPTERA, Tipulidae: *Limnobia reciproca* Walker (1849: 50), one in the BM (1845–68) (now *Trimicra pilipes* F.). This almost certainly refers here as Edwards (1927) recorded this species and a chironomid of the genus *Tanytarsus* in a similar situation, 32 miles from the Brazilian coast.

645. Pediculus, from a petrel called Cape-pidgeon, in the open ocean August.
Lost

PHTHIRAPTERA: the bird referred to as the cape-pidgeon is the cape petrel or pintado (*Daption capensis* L.) and is discussed by Gould in the *Zoology* (Darwin, 1841: pt. 3, 140–1).

August **M. Video R. Plata**

646. Diptera, Rat Island, M. Video Do.

The following Diptera described or recorded by Walker from Monte Video probably refer here.

Anthomyiidae: *Anthomyia corelia* Walker (1849: 953–4) (= *Delia platura* Meigen).

Asilidae: *Asilus mucius* Walker (1849: 463).

Bibionidae: *Dilophus thoracicus* Guerin (Walker, 1849: 118).

Calliphoridae: *Musca lyrcea* Walker (1849: 874) (= *Myolucilia*); *M. gamelia* Walker (1849: 878), one in the BM (1845–68) (a synonym of the previous species).

Muscidae: *Anthomyia cutilia* Walker (1849: 954) (= *Psilochaeta chalybea* Wiedemann); *A. felsina* Walker (1849: 954) (= *Neurotrixa*).

Pyrgotidae: *Chromatomyia ?distincta* Walker (1849: 806). Now referred to *Dichromyia sanguiniceps* Meigen and may not belong to this family.

Sarcophagidae: *Sarcophaga tessellata* Wiedemann (Walker, 1849: 829); *S. chlorogaster* Wiedemann (Walker, 1849: 834); *S. proerna* Walker (1849: 835) (= *Sarconesia chlorogaster* Wiedemann).

Sphaeroceridae: *Borborus quinquemaculatus* Walker (1849: 1130) (=*Archiborborus hirtipes* Macquart).

See also entry 671.

647. Blatta Do. Do. Do.

BLATTODEA: *Blabera brasiliana* Saussure (Walker, 1868: 2), no specimen found; *B. dubia* Serville (Walker, 1868: 9), one in the BM (1845–68).

664. Pediculus, from a Tringa (Peewit) Do.

PHTHIRAPTERA: no specimen found. The bird referred to is *Vanellus cayanus* Gray, the pied plover referred to as *Philomachus cayanus* by Gould in the *Zoology* (Darwin, 1841: pt. 3, 127), where, in Darwin's notes on behaviour, it is compared with the British peewit. Like our peewit it has a local name, 'tero-tero', derived from its cry.

665. Curculio, on sandy hillocks near the sea Do.

COLEOPTERA, Curculionidae: no specimen found.

666. Cillenum ?(Leach) under stones in mud, Rat Island, water brackish August.
Lost

COLEOPTERA, Carabidae: *Cillenum[s]* is a synonym of *Bembidion*. No specimen found.

667. Agonum ?allied to; elytra singularly sculptured; Habit Do. Do. Do.
Lost

COLEOPTERA, Carabidae: no specimen found.

671. Diptera. very common here Do. Do.

Sciomyzidae: *Tetanocera angulifera* Walker (1849: 1085), three in the BM (1845–68) are referred here rather than to 646, as the presence of three specimens suggests it may have been 'very common'.

672. Acarus from Cavia capybara (Linn). Do.

Arachnida, Acari—not an insect.

673. Ricinus, from Rhynchops. Do.
Lost

PHTHIRAPTERA: no specimen found. The host bird referred to is *Rhynchops niger* L., the Black Skimmer discussed in the *Zoology* (Darwin, 1841: vol. 3, 143–4) and the *Journal* (Darwin, 1845: 137).

674. Moth, common on the mount. [Green Mount, 450′ high] Do.

LEPIDOPTERA, Arctiidae: *Ecpantheria indecisa* Walker (1855: 697), four in the BM (1846–38), S. America, one with white printed label 674.

675. Beetle, found in middle of an ants nest **(accidental?)** Do.

COLEOPTERA: no specimen found. Some beetles normally live in ants nests.

676. Carabidae [beetle-struck out] common under the drift **matter** of the tide. **Do.** (August)
Lost

1832 Insects M. Video August 9.

677. Heterom: 4: Poecilus, Dermestes, Necrobia, Haltica, Galeruca, Coccinella, Forficula, Harpales, Amarus, Pterostichus, Trechus, Peryphus, 2 Curculio, Forficula, Corixa, 2 Harpalus, Noloptes, Capsida, Colymbetes, Feronia, Pentatoma, Silpha, Hygrotus, Hister, 2 Chrysomela. The greater **number** found under stones and sticks. Hybernating [*sic*] on the Mount. [Several scientific names have one letter spelling corrections by Darwin.]

COLEOPTERA, Carabidae: *Antarctia circumfusa* Germar, three in BM (1880–43, 1863–49), one numbered 677. *Bembidion (Notaphus) embei* Solier (det. N. E. Stork), one in the BM

(1885–119) with handwritten 677. The following untraced (and probably misidentified Carabidae recorded from Monte Video are also referred here although some may refer to 678. *'Baripus speciosus* (Klug) Dejean' (Waterhouse, G. R., 1840*c*). '*Baripus rivalis* Dejean (*Molops rivalis* Germar)' (Waterhouse, G. R., 1840*c*). *'Feronia corinthia* Dejean (*Molops corinthia* Germar.)' (Waterhouse, G. R., 1841*b*). *Feronia submetallica* Waterhouse, G. R., 1841*b*: 122). *Feronia assimilis* Dejean (Waterhouse, G. R., 1841*b*). *Feronia (Argutor) patagonica* Waterhouse, G. R. (1841*b*: 126). There are also 3 *Agonum* spp. numbered 677 in the BM (1885–119) accessions.

Chrysomelidae: *Platynocera murina* Blanchard, one in the BM (1885–119) numbered 678 (included here because this family is not mentioned under entry 678).

Coccinellidae: *Coccinella aucoralis* Germar, one in the BM (1885–119), Monte Video, is referred here as this family is not mentioned under entry 678.

Curculionidae: *Listroderes apicalis* Waterhouse, G. R. (1842*b*: 123), one in the BM (1885–119) numbered 677. (See also entry 678).

Scarabaeidae: *Trox pilularius* Germar, six in the BM (1887–42) each with a handwritten 677.

Tenebrionidae: *Crypticus platensis* Fairmaire, one in the BM (1887–42) with a handwritten 677 (see also 491, 1321). *Epipedonota bonariensis* Waterhouse, G. R. (1842*b*: 119).

HEMIPTERA, Pentatomidae: *Mecocephala acuminata* Dallas (1851: 180; also Walker, 1867), one in the BM (1845–68). *Aceratodes fulvicornis* F. (Dallas, 1851; Walker, 1867), one in the BM (1845–68) (= *Edessa*).

Pelogonidae: two of this family at Cambridge, labelled S. America and with a green label printed 6 may refer here. These bugs are semi-aquatic and seem to fit better here (with *Colymbetes* and *Corixa* mentioned) than under 2444, 2446.

No Dermaptera ('Forficula') have been found for this entry.

678. (7 Lamellicorn: I). 2 Heterom: 2 Curculio. 9 Carabidae insects found Do. Do.

COLEOPTERA, Carabidae: *Bembidion (Notaphus) embei* Solier (det. N. E. Stork), three in the BM (1885–119) and a handwritten number 678. *Feronia dejeanii* Waterhouse, G. R. (1841*b*: 121), one in the BM (1863–44) numbered 678. *Feroniola laticollis* Sol (det. S. L. Straneo, 1950), one in the BM numbered 678. *Feronia cordicollis* Dejean (Waterhouse, G. R., 1841*b*), one in the BM (1863–44) numbered 678 (= *Pterostichus*). There are also two *Agonum* spp. numbered 678 in the BM (1885–119) accessions.

Curculionidae: *Listroderes apicalis* Waterhouse, G. R. (1841*b*: 123), two in the BM (1845–63, 1885–119) both numbered 678 (see also entry 677).

Dermestidae: *Dermestes maculatus* Degeev, two in BM (1887–94), numbered 678.

Silphidae: *Oxelytrum erythrurum* Blanchard, one in the BM (1885–119) numbered 678 (see also entry 796).

691. Harpalidae (one of) Mount Do.

COLEOPTERA, Carabidae: no specimen found.

692. Cerambyx buildings: M. Video Do.

COLEOPTERA, Cerambycidae: *Cyllene spinifera* Newman (1840 gen. & sp.: 8)—'Inhabits South America taken by Mr Darwin, in cabinet of Entomological Society'—one in the BM (1863–44), Monte Video, with printed number 692.

B. Blanca. Northern Patagonia [with a short rule inserted above].

694. Harpalidae (one of) Bahia Blanca.

COLEOPTERA, Carabidae: no specimen found.

695. Meloe: elytra with bright yellow spots, sides of abdomen red, emitted yellow fluid. from Do.

COLEOPTERA, Meloidae: no specimen found.

696. 697. 698. Trox (3 species) B. Blanca Sept.

COLEOPTERA, Scarabaeidae: *Trox brevicollis* Eschscholtz, one in the BM with C. Darwin [18]87–42 printed on a green label and no further data, but the rest of the series (non-Darwin) are from Chile.

See entry 677 for another reference to this genus.

699. 700. 701. 702. 4 species of Melasomes. Tolerably abundant, in
(a) Sand hillocks Do. Do.
(a) [from verso of page] **(700) Is the commonest insect in the place runs very actively on the sand.—**

COLEOPTERA, Chrysomelidae: no specimen found.

703. Scarabidae. All these beetles inhabit sandy hillocks near sea. This beetle seems to live on the dung of ostriches. I saw one busily employed in pushing along a large peice [sic] with its frontal horns from Do. Do. 19th.

COLEOPTERA, Scarabaeidae: *Eucranium dentifrons* Guérin, one in the BM (1887–42, as *Anomiopsis*) numbered 703. *Ataenius rubripes* Boheman, two in the BM (1887–42), B. Blanca. *Homalochilus niger* Blanchard, one in the BM (1885–119), B. Blanca. *Megathopa violacea* Blanchard, one in BM (1845–63).

The last three (unnumbered) species are also allocated here but seem rather small for the above observation (see also 1492). The 'ostrich' is the common rhea (*Rhea americana* Latham) and is written about at length both in the *Zoology* (Darwin, 1841: pt. 3, 120–3) and the *Journal* (Darwin, 1845: 43, 89).

705. 706. 707. Heteromerous insects, Sandy plains Do.

COLEOPTERA, Tenebrionidae: *Nyctelia puncticollis* Waterhouse, G. R. (1842*b*: 110)—'tolerably abundant on sand hillocks'—one in the BM (1845–63). *Scotobius ovalis* Guérin, two in BM (1845–63, 1885–119), former numbered 707.

See also entry 724 for other *Nyctelia*.

708. Staphylinus Do. Sept.

COLEOPTERA, Staphylinidae: no specimen found, unless the specimen recorded by Kritsky (1981) in the Field Museum, Chicago refers here. No further data is available so the Chicago specimen could also refer to 3445.

709. Insects Do. Do.

COLEOPTERA, Nitidulidae: *Neobrachypterus darwini* Jelinek (1979: 194), 21 specimens in the BM (1885–119) numbered 709. There is also an unidentified weevil (Curculionidae, Baridinae) in the BM accessions: Bahia Blanca, 709.

717. Harpalidoes [?]: I: sandy plain. Do. Do.

COLEOPTERA, Carabidae: no specimen found.

718. Meloe. hillocks. Hind legs very long, forehead angular; sides of abdomen bluish. Do. Do.

COLEOPTERA, Meloidae: no specimen found.

719. Lamellicorn (Hoplia) copulating in great numbers, sandy plain. Do. Do. 19th.

COLEOPTERA, Scarabaeidae: no specimen found.

720. Lamellicorn Do. Do.

COLEOPTERA, Scarabaeidae: no specimen found.

721. Coccinella. Do. Do.

COLEOPTERA, Coccinellidae: *Pullus piceipennis* Brèthes (1924: 170) is from Bahia, Blanca but appears to refer to 1495.

722. Coccinella (allied to) Do. Do.

COLEOPTERA, Coccinellidae: no specimen found.

1832 Insects B. Blanca Sept. 10.

724. Coleoptera. Heterom; Rio Negro.

Tenebrionidae: *Nyctelia rugosa* Waterhouse, G. R. (1842*b*: 111), recorded from Bahia Blanca, but no specimen found; see also entry 864. *N. saundersii* Waterhouse, G. R. (1842*b*: 111), two in the BM

(1863–44), Bahia Blanca. *N. nodosa* Waterhouse, G. R. (1842*b*: 115), recorded from Bahia Blanca but no specimens found. *Epipedonota bonariensis* Waterhouse, G. R. (1842*b*: 119), recorded from Bahia Blanca but no specimen found. *Scotobius muricatus* Guérin (= *crispatus* Germar), one in the BM (1885–119) Bahia Blanca.

See also entries 705–707.

725. Colymbetes. **B. Blanca**

COLEOPTERA, Dytiscidae: no specimen found.

726. Carabidous beetle from **the mud** banks **of the harbor** [sic].
Lost

COLEOPTERA, Carabidae.

752. Carabidous beetle inhabiting sand hillocks.

COLEOPTERA, Carabidae, Harpalinae: one in the BM (1887–42), Bahia Blanca and white label with printed 752.

753. Crysomela [sic] on a flower.

COLEOPTERA, Chrysomelidae: *Cryptostetha juanae* Bechyne (det. M. Daccordi), one in BM, Bahia Blanca. See also 766).

765. Lamellicorn from Monte Hermosa B. Blanca.

COLEOPTERA: no specimen found.

766. Chrysomela [sic] near the sea Do. Do.

COLEOPTERA, Chrysomelidae: see entry 753 which could refer here instead.

767. Harpalus Do. Do.

COLEOPTERA, Carabidae: no specimen found.

768. Elater. Do. Do.

COLEOPTERA, Elateridae: no specimen found.

778. Bruchus from the Calavances **on board.**

COLEOPTERA, Bruchidae: *Acanthoscelides objectus* Say, one in the BM (1885–119) and numbered 778. Calavances was an English common name for certain varieties of pulse (Leguminosae, *Dolichos* etc.) (Mrs M. Greiff *in litt.*) This beetle is a well-known pest of stored products and although thought to have originated in tropical S. America is now almost cosmopolitan (Aitken, 1975). See also 630.

786. Curculio B. Blanco [a] Sept.

COLEOPTERA, Curculionidae: no specimen found.

787. Lamellicorn Do. Do.

COLEOPTERA: no specimen found.

788. Amara: sandy hillocks Do. Do.

COLEOPTERA, Carabidae: no specimen found.

789. Clavipalpes. Heterom. Lat: living at roots of grass; sandy hillocks Do. Do.

COLEOPTERA: no specimen found.

790. Pulex from the Armadillo (375) Do. Do.

See *Spirits of Wine* list, no. 376.

795. Carab: sand hillocks; beautiful comb of spines over the tarsi.

The following may refer here:

COLEOPTERA, Carabidae: *Odontoscelis darwinii* Waterhouse, G. R. (1840*a*: 356), one in the BM (1863–44) (= *Cnemacanthus*). See Fig. 14. *O. striatus* Waterhouse, G. R. (1840*a*: 358), one in the BM (1863–44) 'on a sandy plain at Bahia Blanca' (= *Cnemacanthus*). *Cardiophthalmus stephensi* Waterhouse, G. R. (1840*a*: 361), one in the BM (1863–44), Bahia Blanca (= *Barypus*).

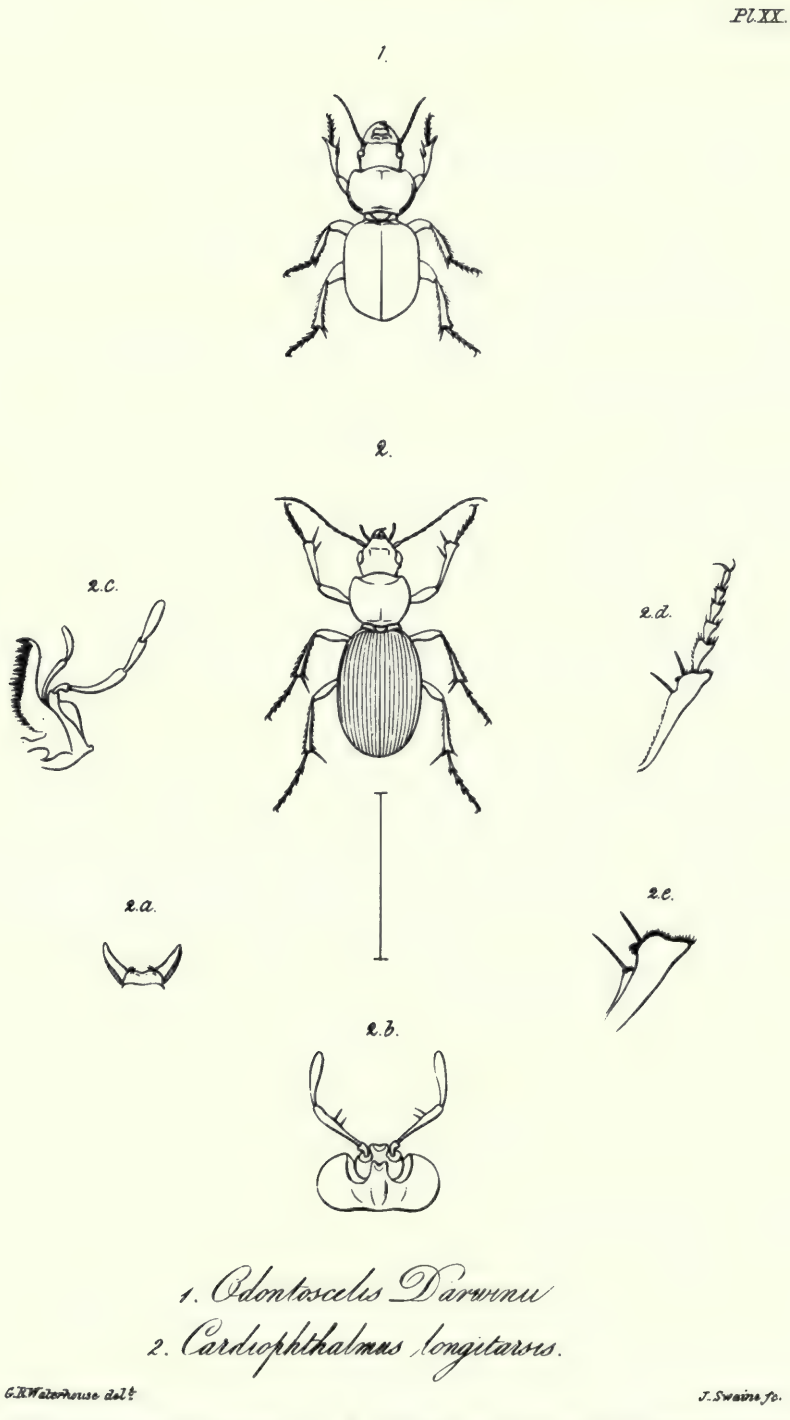

Fig. 14 Two Carabid beetles described by G. R. Waterhouse: *Odontoscelis darwinii* from Bahia Blanca and *Cardiophthalmus longitarsis* from Port Desire (see *Insect Notes*, 795 and 1794) (from the *Annals and Magazine of Natural History* (1840), by courtesy of Taylor & Francis Ltd.)

796. Silpha. in numbers feeding on carrion with Trox and Dermestes Do. Do.

COLEOPTERA, Silphidae: *Oxelytrum erythrurum* Blanchard, one in the BM (1885–119), Bahia Blanca. See also 678.

797. Lamellicorn; I think this number has been used twice: once for a large bush, bearing very sweet flowers and no leaves Do. Do.

COLEOPTERA, Scarabaeidae: *Pachrodema flaveola* Moser, one in the BM (1887–42), B. Blanca and printed label 797.

820. Harpalus M. Hermosa.

COLEOPTERA, Carabidae: no specimen found.

829. Fly just killed a gnat. B. Blanca Do. [This entry is followed by a rule across the page presumably by Darwin to indicate end of Bahia Blanca entries—see inserted heading above entry 694.]

DIPTERA: no specimen found.

839. Saperda on the trunk of the Plytocalla; (a large tree), B. Ayres.

COLEOPTERA, Cerambycidae: no specimen found.

840. Diptera on flowers. B. Ayres.

No specimen found.

841. Do. Do. Do.

No specimen found.

842. Coleoptera Do. Do.

Scarabaeidae: *Canthidium breve* Germar, two in the BM (1887–42), B. Ayres. See also entry 843 for this species.

843. Coleoptera M. Video.

Carabidae: *Bembidion (Notaphus) embei* Solier (det. N. E. Stork), one in the BM (1885–119), Monte Video and numbered 843. See also entries 677, 678 for this species. *Feronia cordicollis* Dejean (Waterhouse, G. R. 1841*b*), one in the BM (1885–119), Monte Video and numbered 843. *Feroniola laticollis* Solier (det. S. L. Straneo, 1950), one in the BM numbered 843. There are also 3 *Agonum* sp. numbered 843 in the BM (1885–119) accessions.

Scarabaeidae: *Canthidium breve* Germar, two in the BM (1887–42), Monte Video and numbered 843.

Tenebrionidae: *Scotobius pilularius* Germar (=*miliaris* Billberg), one in the BM (1885–119) numbered 843.

848. Heterom; common under stones. Do.

COLEOPTERA: no specimen found.

849. Nest of Bee, under stones. Contained leaden blue, slightly sweet honey; mouth closed by a sepal of a flower M. Video.

No specimen found.

1832 *Insects* *M. Video* *11.*

850. Heterom. feeding on Compositae **flowers** and when touched, like Meloe emitting yellow fluid. Do.

COLEOPTERA, Melyridae: *Astylus quadrilineatus* Germar (Champion, 1918*c*) may refer here.

851. Heterom; habits Do. Do. Do.

COLEOPTERA: no specimen found. See entry 850.

858. Coleoptera—The Mount.

Carabidae: *Feronia (Poecillus) depressa* Waterhouse, G. R. (1841*b*: 126), one in the BM (1885–119), Monte Video, numbered 858 (= *Cynthidia planodisca* Perty).

Scarabaeidae: *Ateuchus robustum* Harold, one in the BM (1887–42), M. Video and numbered 858. See also entry 1505 for this species.

860. Meloe. San Blas: Bay of Patagonia. **North of R. Negro**

COLEOPTERA, Meloidae: no specimen found.

861. Belostomus, in Water, Rat Island. M. Video.

HEMIPTERA, Belostomatidae: no specimen found.

862. Calosoma; flew on board when we were about 10 miles from the shore; Bay of San Blas.

COLEOPTERA, Carabidae: *Calosoma patagoniense* Hope (1838: 129), one in the BM (1863–44) and numbered 862. See also entry 2484 for this species.

In the *Journal* Darwin (1845: 158) says '. . . and a fine beetle (Calosoma) flew on board. Other instances are known of this beetle having been caught far out at sea; and this is the more remarkable as the greater number of the Carabidae seldom or never take wing'. He goes on to discuss the weather conditions and the movements of the other insects involved. See the entry cited under 870–872. See also entries 875, 1301–1303.

863. Lamellicorn. San Blas.

COLEOPTERA: no specimen found.

864. Heterom. Do.

COLEOPTERA, Tenebrionidae: *Nyctelia rugosa* Waterhouse, G. R. (1842*a*: 138), one in the BM (1863–44), labelled 'Bahia Blanca' and with printed number 864.

866. Moths, flying about the ship, the chrysalis **probably** were in the fire wood.

LEPIDOPTERA, Geometridae: *Macaria subornata* Walker (1863: 1644), one in the BM (1846–38), 'probably from Patagonia' (described from Monte Video), may refer here. See also entry 1597.

867. 868. 869. Carabidous beetle, dead in the sea; 40 miles off the Straits of Magellan.

Carabidae: *Cardiophthalmus clivinoides* Curtis, one in the BM (1863–44) 'str. of Magellan' on handwritten label. Waterhouse, G. R. (1840*c*: 254, footnote) says 'I find that I had accidentally overlooked a specimen of the *Cardiophthalmus clivinoides* Curtis, in Mr Darwin's collection. This specimen was "found dead in the sea, 40 miles off the Straits of Magellan"—Mr Darwin's Notes.' Curtis (1839, *Trans. Linn. Soc. Lond.* **18:** 185) described the species from material collected at Port Famine by Captain King during his survey of the Straits of Magellan. *Antarctia leucoscelis* Putzeys, one in the BM (1885–119) S. America (det. Straneo 1950) with printed number 869.

870. 871. 872. Butterflies vide **P.** 138.

In the *Journal* Darwin (1845: 158) writes 'One evening, when we were about ten miles from the Bay of San Blas, vast numbers of butterflies in bands or flocks of countless myriads, extended as far as the eye could range. Even by the aid of a telescope it was not possible to see a space free from butterflies. The seamen cried out "it was snowing butterflies", and such in fact was the appearance. More than one species were present, but the main part belonged to a kind very similar to but not identical with, the common English *Colias edusa*. Some moths and hymenoptera accompanied the butterflies.' See also entries 1301–1303.

Williams (1930: 137) refers this butterfly to *Colias lesbia* F. (Pieridae) and says 'Fitzroy (1839) says "white" butterflies about 4 p.m. in very hot weather with cloudless sky. He also gives the exact date, which is omitted by Darwin'. The exact date referred to is December 4th 1832 and is included by Darwin in the *Zoological Diary* on which the *Journal* entry is based, but he goes on to ask 'How are we to account for these flights which others have also observed? Is it an instinct implanted in the animal to find new countries its own one being overtaken by a particularly favourable year?'

No specimen has been located. See also entries 1301–1303.

J. J. Walker (1931) suggests that Fitzroy's 'white' butterflies could be other Pieridae but no specimens have been found. *Colias lesbia* is greenish white, rather like the *helice* form of our 'British' *C. croceus* Geoffroy (= *edusa* F.).

873. Libellula. M. Video.

ODONATA: no specimen found.

874. Cimex, San Blas [coast S. of Bahia Blanca, Patagonia].

HEMIPTERA: no specimen found.

875. **C. Corientes south of the mouth of the R. Plata a)** Fresh water and Carabidous beetles found alive in the sea. South of Cape Corrientes, flown off the shore ? I was very much surprised to see how perfectly alive and active the fresh Water beetles were (Colymbetes, Hydroporus, Hydrobius &c; and there were other insects which I by accident lost). This may be a very instrumental means in peopling Islands with insects; I cannot help suspecting they were washed down from the Plata; although 250 miles distant from **the** fresh Water. I think this from the numbers of living and dead ones floating in the sea. The distance from the nearest shore was 17 miles, off Cape Corrientes; Capt. Cook, saw numerous insects blown off near St Georges Bay; and formerly in last voyage this fact was frequently noticed; [continued]

a) [from verso] **The neighbouring country is exceedingly arid & not likely to support freshwater insects.**

1832 Insects Good Success Bay Decr 20th 12.

[continued] it must be owing to flat country without trees, no shelter; insects once in air cannot stop.

COLEOPTERA, Carabidae: *Bembidion* sp. (det. N. E. Stork), one in the BM (1885–119). 'In sea off C. Corrientes Argentina' with handwritten 'Plata Patag 875'. There is also an *Agonum* sp. numbered 875 in the BM (1885–119) accessions.

Hydrophilidae: *Enochrus* sp., one in the BM numbered 875. There are also two *Enochrus* spp. in Cambridge which could refer here (but see also entries 1314, 1505 and 2367).

The following Dytiscidae *may* refer here though described from Tierra del Fuego.

Dytiscidae: *Colymbetes darwini* Babington (1842: 8), one in the BM (1863–44) (= *Rhantus signatus* F.); *C. magellanicus* Babington (1842: 10), two in the BM (1863–44) (= *Platynectes*); *Hydroporus unidecemlineatus* Babington (1842: 13), two in the BM (1863–44) (= *Necterosoma*) (see comment on this species in entry 3561).

A similar account to the above entry is given in the *Journal* (Darwin, 1845: 159) with a general discussion of insects at sea including items quoted under 862 and 867–872.

In the *Origin* Darwin (1859) says 'The occasional emigrations of insects of many kinds, associated together, which as I have witnessed, must perish by countless myriads in the sea, are still more remarkable, as they belong to families none of which are naturally social or even migrate'. See also entries 640, 1301–1303, and for similar accounts see Walker, J. J. (1931: 215).

880. Carabus, damp forest; **this** Carabus does not ascend the mountains. **Navarin Id. South T. del Fuego**

COLEOPTERA, Carabidae: *Carabus suturalis* F. (Hope, 1838) (s.g. *Ceroglossus*) may refer here. Hope mentions that 'when captured, it emitted (like all the other species of Carabus from Tierra del Fuego) a strong ammoniacal odour'. See also entry 2327.

881. Harpalidous **I**: found flying in numbers about sea coast in evening. These insects live amongst the soft yellow balls which are excrescences; **or rather fungi growing on the** Fagus antarcticus, and which are eaten by the Fuegians.

COLEOPTERA, Carabidae: *Abropus splendidus* Waterhouse, G. R. (1842*a*: genus 134, species 135). (= *Habropus carnifex* F.), one in the BM (1863–44) with blue handwritten labels. See also entries 906 and 1839. See Fig. 15.

The fungus was described by the Revd J. M. Berkeley (1842*b*: 37) as *Cyttaria darwinii* and it is illustrated and discussed at some length in the *Journal* (Darwin, 1845: 236).

[There are two vertical ink lines drawn (by Darwin?) through this and the following two entries apparently to link the three entries.]

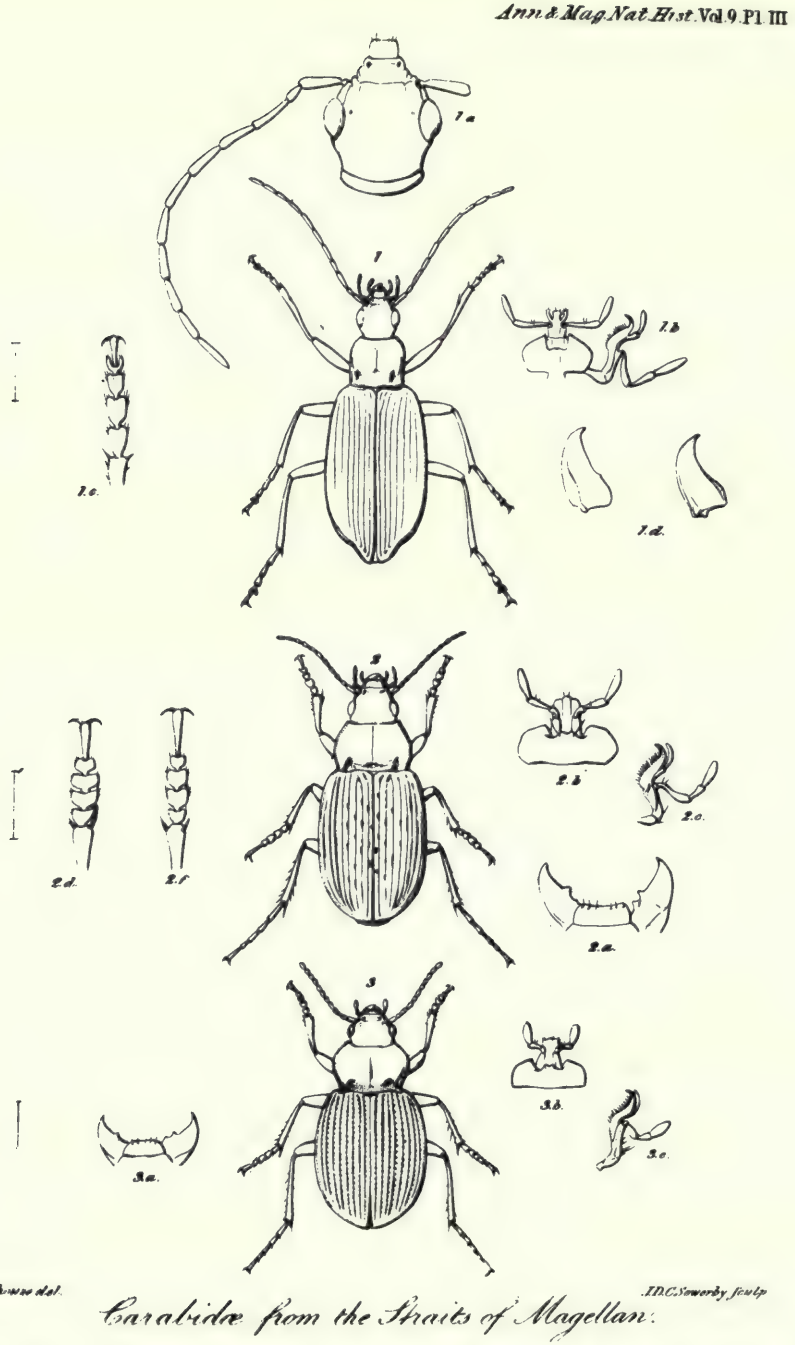

Fig. 15 Three Carabid beetles from the Straits of Magellan described by G. R. Waterhouse: 1, *Abropus splendidus*; 2, *Migadops virescens*; 3, *Migadops ovalis*. All occur in Navarin Island, both genera were new to science (see *Insect Notes* 881, 882, 906, 930) (from the *Annals and Magazine of Natural History* (1841), by courtesy of Taylor & Francis Ltd.) *Abropus splendidus* lives among the edible fungus *Cyttaria darwinii* Berkeley which grows on the Southern Beech (*Nothofagus*) and is eaten by the natives of Tierra del Fuego.

882. Harpalidous; the most abundant insect, under stones & c **in the** damp forest. [Navarin Island].

COLEOPTERA, Carabidae: *Migadops virescens* Waterhouse, G. R. (1842*a*: 136 (gen. & sp.), pl. 3, fig 2), above data given, six in the BM (1885–119, 1842–14, 1863–44), Tierra del Fuego, one with printed number 882 (= *M. laeta* Guérin). Champion (1918*a*) places this species in *Brachycoelus*. See Fig. 15.

883. Harpalidous **I:** the only insect which I found inhabiting the very bare Summits of the mountains. **n.b.** The woods are all more or less **elevated** above the sea.

COLEOPTERA, Carabidae: *Migadops ovalis* Waterhouse, G. R. (1842*a*: 139, pl. 3, fig. 3) may refer here, see fig. 15, also entries 908, 911 and 1049.

884. Lamellicorn ['*Sericodes Reichii* Guer.' comment inserted by unidentified hand. See also entry 968.] common in the forest.

COLEOPTERA, Scarabaeidae: *Sericoides glacialis* F., one in the BM (1885–119), Tierra del Fuego with printed 884 and handwritten 'reichii Guer'.

906. Coleoptera; wooded hills [Navarin I.]

Carabidae: *Abropus splendidus* Waterhouse, G. R. (1842*a*: genus 134, species 135) (= *Habropus carnifex* F.), one in the BM (1863–44) numbered 906, see Fig. 15 and also entries 881 and 1839. *Antarctia blanda* Dejean, one in the BM (1880–43), Tierra del Fuego and numbered 906. *Antarctonomus peroni* Chaud (Champion, 1918*b*) (= *A. complanatus* Blanchard), two in the BM (1885–119), Tierra del Fuego, numbered 906. *Bembidiomorphum convexum* Champion (1918*b*: 44, 45), one in the BM (1885–119), Navarin and numbered 906, see also entries 1010, 1049 and 2449. *Trechus antarcticus* Dejean, one in the BM (1885–119) numbered 906, see also entries 1061, 1151 (Now in *Trechisebus* see Jeannel, 1927).

Scarabaeidae: *Listronyx testaceus* F. (= *Sericoides*), one in the BM (1885–119), Tierra del Fuego, numbered 906.

Staphylinidae: *Nordenskjoldella flavitarsis* Enderlein (Champion 1918*b*) probably refers here.

908. Coleoptera—from the very summit under stones; Katers Peak. Katers Peak abrupt cone of Greenstone 1700 feet high, in Hermit Island near Wigwam Cove not far from Cape Horn.

Carabidae: *Cascellius nitidus* Waterhouse, G. R. (1840*c*: 255), two in the BM (1863–44), Tierra del Fuego and Navarin I. *Migadops ovalis* Waterhouse, G. R. (1842*a*: 139); two in the BM (1880–43), see Fig. 15, also entries 883, 911, 1049. *Trechus hornensis* Fairmaire, 12 in the BM (1885–119), numbered 908, see also entry 909.

Curculionidae: *Antarctobius lacunosus* Fairmaire (Champion, 1918*b*) (= *Listroderes*), three in the BM (1880–43), numbered 908, see also entry 2415. *A. rugirostris* Champion (1918*b*: 54), one in the BM, Hardy Peninsula, Cape Horn (= *Listroderes*). *Listroderes katerensis* Champion (1918*b*: 53), two in the BM (1880–43), numbered 908. *L. quadrituberculatus* Champion (1918*b*: 51), two in the BM (1880–43), one numbered 908.

Perimylopidae: *Hydromedion elongatum* Waterhouse, C. O. (1875: 333), three in the BM (1875–35), numbered 908.

909. Carab: very abundant. Hab. Do.

COLEOPTERA, Carabidae: *Trechus hornensis* Fairmaire, one in the BM (1885–119) with printed number 909 (= *Trechisibus*, see Jeannel, 1927). See also entries 908, 1025.

910. Carab: under stones sea beach. Wigwam Cove also in hills Navarin Island.

COLEOPTERA, Carabidae: *Migadops virescens* Waterhouse, G. R. (1842*a*: 136) (= *laeta* Guérin). Champion (1918*a*) places this species in *Brachycoelus*.

911. Carab: (same as 883?) very abundant, summit Katers Peak.

COLEOPTERA, Carabidae: *Migadops ovalis* Waterhouse, G. R. (1842*a*: 139, pl. 3, fig. 3) may refer here. See also entries 883, 908, 1049.

912. 913. Heterom. common very summit Katers Peak.

COLEOPTERA, Perimylopidae: *Hydromedion elongatum* Waterhouse, C. O. (1875: 333), one in the BM (1875–35), with printed 913.

Tenebrionidae: *Parahelops pubescens* Waterhouse, C. O. (1875: 334), one in the BM (1887–94 [error for 1887–42]), with printed 912.

914. Curculio on Fagus antarcticus [Tierra del Fuego].

COLEOPTERA, Curculionidae: *Lophotus longipes* Waterhouse, G. R. (1840*b*: 334), one in the BM (1863–44). *L. vitulus* F. (Waterhouse, G. R., 1840*b*), one in the BM (1863–44) (now var. *bulbifer* Kuschel) (= *Aegorhinus*).

Dr G. Kuschel, in a letter to R. T. Thompson, says *L. vitulus* is the commonest weevil on *Nothofagus* and that *L. longipes* (= *Alastoropolus strumosus* Olivier) is *confined* to *Nothofagus*.

923. Ricinus, from Albatross, Cape Horn, Jan: 1833.

PHTHIRAPTERA: no specimen found.

925. Libellula, Navarin Island.

ODONATA: no specimen found.

930. Harpal; Navarin Island. Jan.

COLEOPTERA, Carabidae: *Migadops darwinii* Waterhouse, G. R. (1842*a*: 138), two in the BM (1842–14, 1863–44), Tierra del Fuego. *M. virescens* Waterhouse, G. R. (1842*a*: 136), one in the BM (1885–119) with printed 930. *M. nigrocaeruleus* Waterhouse, G. R. (1842*a*: 138), one in the BM (1863–44), Tierra del Fuego.

967. Hymenoptera, Ponsonby Sound.

No specimen found.

1833 Insects Tierra del Fuego Jany 13.

968. Lucanus in rotten Beech. Ponsonby Sound. ['Dorcus femoralis Guerin see my Catal no 520 (*D. rubripes*—Dupont)' this comment added to ms by unidentified hand. See also entry 884.]

COLEOPTERA, Lucanidae: *Dorcus darwinii* Hope (1841: 33; 1844: 279), one in Oxford which Hope (1844: 280) erroneously recorded from Chile though the species does occur there (see 2773) (= *Sclerognathus femoralis* Guérin). There are other non-Darwin specimens of this species in the BM from Tierra del Fuego. See also eponyms for dedication.

969. Hemipt:, in great numbers under rotten bark Ponsonby Sound.

HEMIPTERA: no specimen found.

1005. Alpine Colymbetes. Hardy Peninsula. Feby.

COLEOPTERA, Dytiscidae: *Colymbetes rotundicollis* Babington (1842: 7), alpine situation in Tierra del Fuego, two in the BM (1863–44), one with a red printed 5 [= 1005] (= *Lancetes*). See also entry 1049.

1006. 1007. Heterom. Mountain H. Do. Do.

COLEOPTERA, Tenebrionidae: *Parahelops darwini* Waterhouse, C. O. (1875: 334), see also 1049, one in the BM (1875–35) with red printed 6 [= 1006]. *P. pubescens* Waterhouse, C. O. (1875: 334), one in the BM (1875–35) with red printed 7 [= 1007].

1008. Byrridae Do. Do. Do.

COLEOPTERA, Byrrhidae: *Morychastes australis* Blanchard (Champion, 1918*b*: 48), Champion regards two Darwin specimens in the BM as wrongly labelled Bahia and referable to Tierra del Fuego.

1009. Carab Do. Do. Do.

COLEOPTERA, Carabidae: *Cascellius aeneo-niger* Waterhouse, G. R. (1840*c*: 256), two in the BM (1863–44), Hardy Peninsula.

1010. Carab. Do. Do. Do.

COLEOPTERA, Carabidae: *Bembidiomorphum convexum* Champion (1981*b*: 44, 45), one in the BM (1885–119) with red printed 10 [= 1010]. See also entries 906, 1049, 2449.

1011. Cimex. Do. Do. Do.

HEMIPTERA: no specimen found.

1012. Haltica. Do. Do. Do.

COLEOPTERA, Chrysomelidae: *Docemina crassipes* Champion (1918*b*: 50), one in BM (1885–119) with printed red 12 [= 1012].

1021. 1022. 1023. 1024. Heteromerous insects. V. **infra (No. 1043).**

COLEOPTERA, Perimylopidae: *Chanopterus brevipennis* Waterhouse, C. O. (1875: 332) (= *paradoxus* Boheman), two in the BM (1885–119, 1875–35) with red printed numbers 21 and 23 [= 1021 and 1023], see also 1049. *Hydromedion elongatum* Waterhouse, (1875: 333), one in the BM (1875–35) with red printed number 22 [= 1022].

1025. Alpine (Bembidium) insect.

COLEOPTERA, Carabidae: *Bembidiomorphum convexum* Champion (1918*b*: 44, 45), 'Hardy Peninsula, near Cape Horn, Navarin Island, also Chile' must refer here; see also entries 906, 1010, 1049. *Trechus hornensis* Fairmaire (= *Trechisibus*, see Jeannel 1927), one in the BM (1885–119) with red printed label numbered 25 [= 1025]. See also entries 908, 909.

1043. Heterom; under stone just above high water mark.

(a) [vide 1021 crossed out? by Darwin].

a) [from verso] The habitat of these insects, was the most singular I ever observed; it was in the fissures of slate rock and in which the genus Capulus [Limpet] was adhering to the stone alive, and therefore of course beneath high watermark:— from the wet condition of the insects and their inactivity I do not believe they remove themselves.—There would appear to be two sorts or **they are** in different states of maturity:— from the soft state of some specimens, the larva must have undergone its metamorphosis in this site.

COLEOPTERA, Tenebrionidae: *Parahelops pubescens* Waterhouse, C. O. (1875: 334), one in the BM with red printed 43 [= 1043]. See 1006,1007. Something is wrong here as this species is now normally associated with alpine *Nothofagus* forest though some other Tenebrionidae are known to be intertidal (e.g. *Epantius, Phaleria*).

1044. Ricinus from the Falco (1028).

PHTHIRAPTERA, Philopteridae: *Ischnocera*, 'Degeeriella group', one tube of six specimens in the BM (1863–44), Tierra del Fuego, with red printed 44 [= 1044].

In the Denny collection at Oxford are 11 specimens mounted on celluloid from Tierra del Fuego which refer here.

The 'Falco' referred to is listed under 1028 in Darwin's *Ornithological Notes* (Barlow, 1963) as 'Falco P. Pezoporus' and is referable to *Milvago chimango* (Viellott) the Chimango Caracara. In the *Zoology* (Darwin, 1841: pt. 3, 14) it is treated by Gould, though somewhat doubtfully, as a separate species *M. pezoporus* Meyen. In the *Journal* Darwin (1845: 54–6) writes at some length on this and related species.

1049. Coleoptera, chiefly H[ardy]. Peninsula. March.

Carabidae: *Antarctonomus peroni* Chaudoir (Champion, 1918*b*) (= *A. complanatus* Blanchard), one in the BM (1885–119) numbered 1049. *Bembidiomorphum convexum* Champion (1918*b*: 44, 45), two in the BM (1885–119), numbered 1049, see also entries 906, 1010, 1025. *Migadops ovalis* Waterhouse, G. R. (1842*a*: 139), one in the BM (1844–3) numbered 1049, see also entries 883, 908, 911.

Dytiscidae: *Colymbetes rotundicollis* Babington (1842: 7), two in the BM (1863–44), numbered 1049, see also 1005.

Perimylopidae: *Chanopterus brevipennis* Waterhouse, C. O. (1875: 332) (= *paradoxus* Boheman) six in the BM (1875–35), numbered 1049, see also entries 1021, 1023.

Tenebrionidae: *Parahelops darwini* Waterhouse, C. O. (1875: 334), one in the BM (1875–35), numbered 1049, see also entry 1006. *P. pubescens* Waterhouse, C. O. (1875: 334), four in the BM (1875–35, 1885–119) and numbered 1049. See also entry 1007.

1050. Harpalidae. Falkland Island. Do.

COLEOPTERA, Carabidae: *Antarctia malachitus* Dejean (now = *Metius*), one in the BM (1885–119) labelled Tierra del Fuego but with a red printed number 50 [= 1050]. Clearly some error has occurred in labelling as the MS labels also indicate Tierra del Fuego, but the species also occurs on the Falkland Islands. G. S. Robinson (1984, *Insects of the Falkland Islands*, 38 pp. BM (NH)) lists Falkland insects.

1051. Ricinus from Scolopax (1048). **Do.**

PHTHIRAPTERA: no specimen found.

The comments under 1048 in the *Ornithological Notes* (Barlow, 1963: 213) link this to *Scolopax* (*Telmetias*) *magellanicus* King in the *Zoology* (Darwin, 1841: pt. 3, 131) which is now referable to the Puna Snipe (*Gallingo paraguaiae magellenica*).

1057. Moth on leaf of black currant bush, Good Success Bay **T. del Fuego.**

LEPIDOPTERA: no specimen found.

1060. Harpal: (Sphodrus?). Falkland Island. Was this insect imported or is it an original inhabitant. March.

COLEOPTERA, Carabidae: *Merizodus maceyi* Bates (Champion, 1918*a*) (=*Oopterus solidadenus* Guérin), one in the BM (1885–119), Falkland, may refer here.

1061. Harpal; abundant near coast East Falkland Island.

COLEOPTERA, Carabidae: *Trechus antarcticus* Guérin (Champion, 1918*a*) 'Falkland and Tierra del Fuego' in Champion's paper (=*Trechisibus*, see Jeannel, 1927), one in the BM (1885–119) with red printed 61 [=1061]. See also entries, 906, 1151.

1071. Fly.

DIPTERA, Heleomyzidae: *Prosopantrum acquiseta* Malloch (1933: 204), two in the BM (1885–119) may refer here.

1086. Harpalidous, insect Do. Both insects are common to Tierra del Fuego.

COLEOPTERA, Carabidae: *Migadops falklandicus* Waterhouse, G. R. (1842*a*: 137), one in the BM (1863–44) with red printed number 86 [=1086]. A different species of the same genus is found in Tierra del Fuego (see entries 882, 883, 910, 911).

1087. 1088. Heterom, near coast. Falkland Isld.

COLEOPTERA, Tenebrionidae: *Parahelops quadricollis* Waterhouse, C. O. (1875: 333, 335).

1137. Gonoleptes. March.

Arachnida (spider)—not an insect.

1151. Coleoptera. Do.

Carabidae: *Trechus antarcticus* Dejean (=*Trechisibus* see Jeannel, 1927), five in the BM (1885–119) numbered 1151 (see also entries 906, 1061).

Curculionidae: *Falklandius turbificatus* Enderlein (Champion, 1918*a*), one in the BM numbered 1151, see also entry 1912.

Staphylinidae: *Phytosus darwinii* Waterhouse, F. H. (1879: 531) (*Antarctophytosus* Champion, 1918*a*, now in *Halmaeusa*) ,may refer here.

1180. Diptera. Hardy Peninsula.

No specimen found.

1181. Scarabaus. Feeding on horse dung and throwing up the sand, like Geotrupes, sand dunes **Maldonado R. Plata.**

COLEOPTERA, Scarabaeidae: no specimen found. See entry 1491.

1883 ***Maldonado:*** *Insects* *March* *14.*

1182. Coleop: feeding on Lycoperdium [*sic*] and Fringi [*sic*—Fungi]

No specimen found.

1183. Notonecta.

HEMIPTERA, Notonectidae: no specimen found.

1225(a) [on verso]

(1225) Aphodius; one of the rare instances of finding these insects in this country, under horse dung which was however not quite fresh. Maldonado.

(1253) Coleoptera in Lycoperdium [*sic*] **(1346). Maldonado.**

(1254) Brachinus; emits loud and visible explosions, lives in families, beneath stones in open plains—Maldonado.

COLEOPTERA. There is an *Aphodius* 'Maldonado Point' (1887–42) in the BM accessions. Some Coleoptera numbered 1291 may refer to 1254. See also entry 1491.

1291. Brachinus. Explosion very loud and visible; the skin of my finger, was for many days afterwards stained brown; at the instant of explosion a sensation of warmth was felt; taste **of secretion** very acrid, even when diluted. June.

COLEOPTERA, Carabidae: *Brachinus maculipes* Waterhouse, G. R. (1841*a*: 351), one in the BM (1863–44), Maldonado. *B. nigripes* Waterhouse, G. R. (1841*a*: 352), two in the BM (1863–44), Maldonado. *B. platensis* Waterhouse, G. R. (1841*a*: 351), (= *B. vicinus* Dejean), four in the BM (1863–44), Maldonado.

1298. Hymenoptera. B. Blanca June.

No specimens found.

1299. 1300. Hymenoptera: Bay of San Blas. Do.

No specimens found.

1301. **1302.** 1303. Lepidop. 1302 Coleoptera, taken 60 miles from nearest land, but much further in direction of wind, mouth of Rio Plata.

LEPIDOPTERA: no specimens found, but probably some species under 1597 refer here.

COLEOPTERA, Carabidae: *Feronia (Poecillus) guerinii* Waterhouse, G. R. (1841*b*: 125), one in the BM (1863–44). Waterhouse repeats Darwin's comments.

1304. Brachinus. Maldonado.

COLEOPTERA, Carabidae. See entry 1291.

1305. Hydrous. **Do.**

COLEOPTERA, Hydrophilidae: *Hydrous palpalis* Brullé, one in Cambridge has a red label printed 305 [= 1305] and a small green printed 43. Alongside is a handwritten label 'Wrong no. attached. In Darwin's list 305 refers to a termites nest from Fernando Noronha'. Clearly the writer had been misled by lack of knowledge of the colour code system of labelling previously explained.

1306. Hemiptera. **Do.**

No specimens found.

1307. 1308. 1309. Hymenoptera. **Do.**

No specimens found.

1310. Coleoptera. **Do.**

Carabidae. *Antarctia striata* Putzeys, three in the BM (1885–119, 1880–43), two numbered 1310, see also entry 1839. *Feronia chilensis* Dejean (Waterhouse, G. R., 1841*b*) (= *Pterostichus*) one in the BM (1885–119), Maldonado, numbered 1310.

Chrysomelidae (Halticinae): *Distigmoptera darwini* Scherer (1964: 291), one in the BM (1887–94 error for 1887–42) numbered 1310 (see Fig. 18, also entry 1321). *Epitrix darwini* Bryant (1942: 101), one in BM (1885–119) numbered 1310. *E. uruguayica* Bryant (1942: 102) may also refer here (or 1321).

Coccinellidae: *Ceratomegilla 18-pustulatus* Mulsant, one in the BM (1885–119), numbered 1310. *Heterodiomus tetraspilotus* Brèthes (see Brèthes 1925*a*), one in the BM (1887–94 error for 1887–42) numbered 1310. *Hyperaspis arrowi* Brèthes var. *darwini* Brèthes (see Brèthes, 1925*a*).

Curculionidae: *Listroderes apicalis* Waterhouse, G. R. (1842*b*: 123), one in the BM (1875–36), 'Maldonado Pl', standing apparently as a syntype, is in fact a specimen of *L. delaigei* and since Waterhouse did not record *apicalis* from Maldonado this may be the specimen he determined as

'costirostris Scho' and is also recorded from Coquimbo. *Torcus nitidulus* Hustache. Two in the BM (1885–119) 'Maldonado Plata', numbered 1310. Baridinae, two unidentified in the BM labelled Maldonado Pl., C.D., numbered 5182. 5183 (not Darwin numbers and 'D' [? = Darwin] on a square label.)

Leiodidae: *Adelopsis darwini* Jeannel (1936: 64, 66), one in the BM (1885–119), numbered 1310.

Melyridae: *Astylus quadrilineatus* Germar (Champion, 1918*c*) may refer here.

Phalacridae: *Phalacrus picipennis* Champion and *P. stratiodiscus* Champion (both 1925: 603), numbered 1310 refer here, see also 1321. In the BM there is also an unidentified species numbered 1310.

Scarabaeidae: *Ataenius opatroides* Blanchard, one in the BM (1887–42), Maldonado, numbered 1310 on verso.

Tenebrionidae: *Scotobius tristis* Guérin, one in BM (1885–119) numbered 1310. *S. muricatus* Guérin (= *crispatus* Germar) one in BM (1885–119).

1314. Fresh Water Coleoptera. **Maldonado** [Maldonado indicated by a bracket including 1314–1332].

Hydrophilidae: *Enochrus,* one in the BM (1885–119), numbered 1314. In Cambridge there are specimens of *E. affinis* Stein and *E. vulgaris* Stein which may refer here, but see also entries 875, 1505, 2367. *Hugoscottia darwini* Knisch (1922: 90) may well refer here. The holotype and paratypes are in the BM (1922–127) ex Mus Cambridge. There are three paratypes in Cambridge. None have data labels or numbers but are attributed to South America. Other members of the genus are from Uruguay and Bolivia.

1316. Coleoptera. [Maldonado].

Carabidae: *Feronia cordicollis* Dejean. (Waterhouse, G. R., 1841) (= *Pterostichus*), one in the BM (1863–44), Maldonado, numbered 1316 (see also entries 678, 843). There is an *Agonum* sp. numbered 1316 in the BM (1885–119) accessions.

1321. 1322. 1323. Coleoptera. [Maldonado].

Anthicidae: *Acanthinus postmaculatus* Pic, one in the BM, Maldonado, numbered 1322 (det. Werner, 1940).

Carabidae: *Antarctia carnifex* Dejean, one in the BM (1880–43), Maldonado, numbered 1323. *A. antiqua* Motschulsky, one in the BM (1880–43) (= *Metius bonariensis* Putzeys, det. S. L. Straneo, 1957), Maldonado. *Baripus rivalis* Dejean (Waterhouse, G. R., 1841*a*), no specimen found. *Chlaenius violaceus* Waterhouse, G. R. (1841*a*: 353), one in the BM (1863–44), Maldonado. *C. westwoodi* Waterhouse, G. R. (1841*a*: 354), one in the BM (1863–44), Maldonado, large blue handwritten data label. *C. platensis* Waterhouse, G. R. (1841*a*: 353) (?*braziliensis* Dejean), one in the BM (1863–44), Maldonado, handwritten label. *Feroniola laticollis* Solier (det. S. L. Straneo, 1950), one in the BM, Maldonado, numbered 1323. *Feronia apicalis* Waterhouse, G. R. (1841*b*: 128) (= *Pterostichus*), two in the BM (1863–44), Maldonado, numbered 1323. *F. corinthia* Dejean (Waterhouse, G. R., 1841*b*), no specimen found. *F. chalcea* Dejean (Waterhouse, G. R., 1841*b*), no specimen found. *F. cordicollis* Dejean (Waterhouse, G. R., 1941*b*), no specimen found. *Geobius pubescens* Dejean (Waterhouse, G. R., 1841*b*), one in the BM (1863–44), Maldonado.

Chrysomelidae (Halticinae): *Distigmoptera darwini* Scherer (1964: 297), one in the BM (1885–119), Maldonado, numbered 1321 (see also entry 1310). *Longitarsus darwini* Bryant (1942: 105) may also refer here (or 1310).

Coccinellidae: *Heterodiomus tetraspilotus* Brèthes (1924: 156), two in the BM (1885–119, 1887–42), Maldonado, numbered 1322. *Nephopullus darwini* Brèthes, one in the BM (1885–119), Maldonado, numbered 1322.

Curculionidae: *Listroderes costirostris* Schoenherr, one in the BM (1845–63), Maldonado, numbered 1323.

Dermestidae: *Dermestes maculatus* Degeer, one in BM (1885–119), numbered 1323.

Dynastidae: *Archophileurus darwini* Arrow (1937: 55) (Scarabaeidae, Dynastinae), one in the BM (1875–35), Maldonado, numbered 1323.

Dytiscidae: *Cybister biungulatus* Babington (1842: 3), Champion (1918*b*: 45) lists this as a synonym of *Megadytes* Brullé and points out that it was overlooked by Sharp (1882) in his important work on Dytiscidae, seven in the BM (1873–8), numbered 1323.

Lathridiidae: one, unidentified, in the BM (1885–119), Maldonado, numbered 1322.

Nitidulidae: one indet. in BM (1885–119) numbered 1321.

Phalacridae: *Phalacrus picipennis* Champion (1925: 603), numbered 1321, 1322 refer here.

Tenebrionidae: *Crypticus platensis* Fairmaire, two in the BM (1885–119, 1887–94 [error for 1887–42]), Maldonado, numbered 1321 (see also 491, 677).

1324. 1325. Leionotus.

COLEOPTERA, Dytiscidae: no specimens found.

This name has been used in Hymenoptera and Coleoptera but was undoubtedly familiar to Darwin as a beetle name used in the Dytiscidae by Stephens (1827–45) for some of his captures. For usage see Balfour-Browne (1950: 266, 271).

1326. 1327. 1328. Lamellicorns. [Maldonado].

COLEOPTERA: no specimens found.

1329. 1330. Orthoptera. [Maldonado].

Tettigoniidae: *Meroncidius inornatus* Walker (1870*a*: 453), one in the BM (1845–68), labelled Monte Video may refer here. See also entry 633.

1331. 1332. Hemiptera. [Maldonado].

No specimens found.

1336. Pediculi from the Bay of St Matthies. Procellaria (1335).

PHTHIRAPTERA: in the Denny collection at Oxford there are six lice on one card with a red printed label 336 [= 1336] and labelled 'Procellaria glacialoides det Y. Z. Eonst c.f. Patagonia C. Darwin'.

The host was 'caught on a bent pin on a string baited with fat' and is discussed in the *Ornithological Notes* (Barlow, 1963: 224) and described in the *Zoology* (Darwin, 1841: pt. 3, 140) under *Procellaria glacialoides* Smith (= *Fulmarus glacialoides*, the southern fulmar).

1379. Forficula, near sand dunes; there is another species in the houses; they are held in extreme dread; it is curious this prejudice against a harmless insect, being so general (July).—**Maldonado.**

DERMAPTERA: *Demogorgon patagonicus* Kirby (1891: 515, pl. 12, fig. 2) (= *labidura*), two in the BM (1885–100) erroneously labelled Patagonia but one specimen with a red printed label 379 [= 1379] clearly refers them here.

1380. Coleoptera (chiefly Carabidous) under stones Guritti Island Maldonado.

See under entry 1397.

1381. Excrescences, containing larvae; **aperture** most beautifully constructed; one found in a particular [continued]

1833 July Insects [Maldonado—crossed out] *15.*

[continued] valley near M. Video. It is said, that a large fly, which bites horses is produced.

This sounds very like the work of semi-aquatic larval Tabanidae (Diptera) which are known to construct mud cylinders in which they avoid dessication in times of drought (see Lamborn, 1929, *Proc. R. Soc.* (B) **106:** 83–7; Parsons, 1971, *Entomologist's mon. Mag.* **107:** 89–90). Darwin collected a specimen of *Tabanus dorsiger* Wiedemann (Walker, 1849: 180) M. Video, which attacks horses.

1394. Phalangium. **Maldonado.**

Arachnida, Opiliones—not an insect; a 'harvestman'.

1395. Pediculi from Falco (1396).

PHTHIRAPTERA: in the Denny collection at Oxford is one unidentified louse mounted on a card with a red label printed 395 [= 1395] and labelled 'Circus megpilus? Maldonado'. This is the *Circus megaspilus* Gould of the *Zoology* (Darwin, 1841: pt. 3, 29) referable to *Circus buffoni* (Gmelin), the long-winged harrier (Dr D. W. Snow *in litt.*).

1397. Coleoptera for (1380 number destroyed).

Carabidae: *Feronia patagonica* Waterhouse, G. R. (1841*b*: 126), two in the BM (1863–44), one numbered 1397. *F. submetallica* Waterhouse, G. R. (1841*b*: 122) (= *Pterostichus lucidus* Curtis), two in the BM (1863–44, 1885–119) numbered 1397; also one specimen Valparaiso; see also entries 2209–2213, 2776, 2837. *Pterostichus* sp., one in the BM, Maldonado, numbered 1397. There are also two *Agonum* sp. numbered 1397 in the BM (1885–119) accessions.

1488. 1489. 1490. Coleoptera. Rio Colorado.

Carabidae: *Pterostichus*. One in the BM (1885–119) with a red label printed 488 [= 1488].

1491. Copris. Bahia Blanca vide **p.** 200 (b).

COLEOPTERA, Scarabaeidae: no specimen found. The page citation in this and entry 1492 refers to the *Zoological Diary* and a discussion of dung beetles, partly used in his long footnote on the subject in the *Journal* (Darwin, 1845: 490) and with cross-references to 1181 and 1225 and which I have spread over 2102, 3506 and 3819. The footnote however lacks the following interesting comment 'This absence of coprophagous beetles appears to me to be a very beautiful fact; as showing a connection in the creation between two animals as widely apart as Mammalia and the Insecta Coleoptera, which, when one of them is removed out of its original zone can scarcely be produced by a length of time and the most favourable circumstances'.

1492. Aphodius, flying by thousands, but not alighting on plentiful horse dung; 10 leagues north of Sierra de la Ventana vide **p** 200 (b).

COLEOPTERA, Scarabaeidae: no specimen found, unless any of the three last entries under 703 refer here. See comments under 1491.

1493. Hemiptera; very abundant in herbage. B. Blanco [a].

No specimen found.

1495. Coleoptera B. Blanco [a].

Coccinellidae: *Pullus piceipennis* Brèthes (1924: 170), one in the BM (1885–119), Bahia Blanca, numbered 1495. See also entry 721.

1496. Carabus. Bajada St. Fe.

COLEOPTERA, Carabidae: no specimen found.

1497. Brachinus. Gorodoña. Rio Parana.

COLEOPTERA, Carabidae: no specimen found.

1498. Heterom; St. Fe Bajada.

COLEOPTERA: no specimen found.

1500. 1501. 1502. 1503. Coleoptera. Bajada.

No specimens found.

1504. Heterom. Rozario **R. Parana.**

COLEOPTERA: no specimen found.

1505. Coleoptera. Bajada. [St. Fe].

Carabidae: *Bembidion* sp. (det. Dr N. E. Stork), five in the BM (1885–119), Santa Fe, two numbered 1505. *Feronia (Argutor) audouini* Waterhouse, G. R. (1841*b*: 128) (= *Pterostichus*), one in the BM (1863–44), St. Fe, numbered 1505. *F. brullei* Waterhouse, G. R. (1841*b*: 127) (= *Pterostichus*), one in the BM (1863–44), St. Fé, numbered 1505. *Pterostichus* sp., one in the BM (1885–119). There is also an *Agonum* sp. numbered 1505 in the BM (1885–119) accessions.

Hydrophilidae: *Enochrus* sp., one unidentified species in the BM, St. Fé, numbered 1505. In Cambridge there are two identified species which could refer here, but see also entries 875, 1314, 2367.

Melyridae: *Astylus quadrilineatus* Germar (Champion, 1918*c*) may refer here.

Scarabaeidae: *Ataenius picinus* Harold, one in the BM (1887–42), St. Fé with 1505 on verso of label; see also entry 529. *Ateuchus robustum* Harold, one in the BM (1887–42), St. Fé and numbered 1505, see also entry 858.

Scraptiidae: *Anaspella* sp. Five in the BM (1885–119), St. Fé, one numbered 1505.

1507. 1508. 1509. Onthophagi caught crawling in a ditch, Buenos Aires.

COLEOPTERA, Scarabaeidae: no specimens found.

1596. Cerambyx. Maldonado.

COLEOPTERA, Cerambycidae: no specimen found.

1597. Moth flew on board in wonderful numbers. Mouth of Rio Plata.

LEPIDOPTERA: moths located in the BM that were described from Monte Video but have no numbers are included here and probably include entries 1302 and 1598. See also entries 674 and 866.

Geometridae: *Camptogramma corticeata* Walker (1863: 1715), one in the BM (1846–38). *Ypsipetes ? impromissata* Walker (1862: 1268), two in the BM (1846–38) (= *Perizoma*).

Noctuidae: *Agrotis intecta* Walker (1857–338), one in the BM (1846–38). *Noctua (Agrotis) suffusa* Meigen (Walker, 1857: 310), no specimen found. *Plusia detrusa* Walker (1858: 919), one in the BM (1846–38).

Sphingidae: *Chaerocampa chiron* Drury (Walker, 1856: 132), no specimen found.

1598. Flew on board in considerable numbers, in Lat, of Rio Negro.

Order ? May include some of the previous entry.

1712. Cicindela (2 specimens) taken on dry mud bank, incrusted with salt, habits like Hybrida. Port St Julian Jany 1834

COLEOPTERA Carabidae, Cicindelinae: no specimen found.

In the *Journal* Darwin (1845: 170), in an entry for 9 January 1834, says 'I found on the surface of the salt water near the head of the bay, a Colymbetes not quite dead, which must have lived in some not distant pool. Three other insects (a Cicindela, like *hybrida*, a Cymindis, and a Harpalus, which all live on muddy flats occasionally overflowed by the sea), and one other found dead on the plain, complete the list of the beetles'. *Cicindela hybrida* is a British species.

For the *Colymbetes* see entry 1715.

1713. Truncatipennis, under salt, loving plant just above high water **mark.**

COLEOPTERA, Carabidae: by inference from the following entry, but no specimen found. The only Carabid I have been able to trace with such a name is the African *Cycloba truncatipennis* Boheman

1714. Hab Do. (young specimen).

COLEOPTERA, Carabidae; ?Pterostichinae, one in the BM (1887–42), St Cruz and with a red printed 714 [= 1714]. See entry 1713.

1715. Colymbites, nearly drowned in salt water, head of Harbour; proving **existence of** fresh water although we could find none.

COLEOPTERA, Dytiscidae: *Colymbetes angusticollis* Curtis (Babington, 1842). See quotation under entry 1712.

1834 Jany Insects Port St Julian 16.

1716. Diptera, very numerous, bite very badly. What animal did nature intend for them? they are out of all proportion too numerous for Guanaco and scarcely any other large animal existed here.

DIPTERA, Tabanidae: no specimen found but my colleague J. E. Chainey suggests it would probably be a *Dasybasis* sp. from these latitudes.

In the *Journal*, in an entry 9 January 1834, Darwin (1845: 170) says 'A good-sized fly (Tabanus) was extremely numerous and tormented us by its painful bite. The common horsefly, which was so troublesome in the shady lanes of E. England, belongs to this same genus. We here have the puzzle that so frequently occurs in the case of mosquitoes—on the blood of what animals do these insects

commonly feed? The guanaco is nearly the only warm-blooded quadruped, and it is found in quite inconsiderable numbers compared with the multitude of flies'.

The guanaco (*Lama guanacoe*) is a llama of the southern plains of South America and included in the *Zoology* (Darwin, 1841: pt. 2, 26) (as *Auchenia llama* Desm.) and written on at some length in the *Journal* (Darwin, 1845: 166). Darwin does not mention horses here but see entries 2524, 2525, 2569.

1717. Heterom (found dead).

COLEOPTERA: no specimen found, but see quotation under entry 1712.

1747. Cells of Bee (1748) adhering to round stones; (on the hills) plain cylinders applied side to side.

HYMENOPTERA: no specimen found.

1748. Bee. (Nest above).

HYMENOPTERA: no specimen found.

1749. Diptera.

No specimen found, unless any of the unnumbered specimens described from Port Famine refer here (see entry 1841).

1750. Curculio, sterile plain.

COLEOPTERA, Curculionidae: no weevil found with this number in the BM, but see entry 2049.

1751. Heterom Do. Do.

COLEOPTERA, Tenebrionidae: *Nyctelia newporti* Waterhouse, G. R. (1842*b*: 113), one in the BM (1863–44), Patagonia. Another in the BM, Patagonia Pt. St Julian C. Darwin with a red printed 751 [= 1751] and the accession number 1881–19 of the F. Bates collection and his type no. 1313. F. Bates, brother of H. W. Bates and a specialist in Tenebrionidae, must clearly have had some of the Darwin material, including some Waterhouse types (see also entries 3201, 3561). [A page width rule follows this entry].

1760. Coleoptera. Port Desire.

Carabidae: *Cardiophthalmus longitarsis* Waterhouse, G. R. (1840*a*: 360) (= *Barypus*), one in the BM (1863–44), Pt Desire. *Odontoscelis curtisii* Waterhouse, G. R. (1840*a*: 357), Port Desire, may refer here.

Coccinellidae: *Adalia deficiens* Mulsant (Babington, 1842), one in the BM (1885–119), Pt Desire, Patagonia, numbered 1760.

Dytiscidae: *Colymbetes nigro-rematus* Babington (1842: 5). (= *Lancetes varius* F.), two Darwin specimens are in the BM without accession or other number.

Tenebrionidae: *Epipedonota lata* Waterhouse, G. R. (1842*b*: 119), two in the BM (1845–63, 1863–44), Pt Desire. *Megalophrys patagonica* Waterhouse, G. R. (1845*b*: 321 gen. et sp.), one in BM (1845–118). *Nyctelia darwinii* Waterhouse, G. R. (1842*b*: 108), three in the BM. *N. fitzroyi* Waterhouse, G. R. (1842*b*: 109), one in the BM (1863–44), Port Desire. *N. plicata* Waterhouse, G. R. (1842*b*: 107), two in the BM (1863–44). *N. solieri* Waterhouse, G. R. (1842*b*: 108), 'Patagonia' may refer here, one in the BM (1863–44). *N. westwoodii* Waterhouse, G. R. (1842*b*: 112), one in the BM (1863–44). *Platesthes silphoides* Waterhouse, G. R. (1845*b*: 317, 319 gen. et sp.), three Darwin specimens in the BM, Port Desire, but no numbers. *Scotobius akidoides* (Waterhouse, G. R., 1845*b*: 319), one in the BM (1845–118).

1793. Heterom. Cape Negro (it is here that the features of Patagonia and Tierra del Fuego are united).

COLEOPTERA, Tenebrionidae: *Nyctelia granulata* Waterhouse, G. R. (1842*b*: 109), one in the BM (1863–44), Cape Negro, with a red printed label 793 [= 1793].

1794. Carab. Hab. Do.

COLEOPTERA, Carabidae: *Antarctia blanda* Dejean, one in the BM (1880–43) and a red printed label 794 [= 1794]. See also entry 906.

1839. Coleoptera under bark. Port Famine. Feb.

Carabidae: *Abropus splendidus* Waterhouse, G. R. (1842*a*: 134, 135 gen. et sp.). (= *Habropus carnifex* F.), one in the BM (1863–44) with Darwin's above data quoted, see also entries 881, 906. *Antarctia striata* Putzeys, one in BM (1863–49), see also entry 1310.

1841. Fly. P. Famine.

DIPTERA, Tachinidae: *Pelycops darwini* Aldrich (1934: 169), one in the BM (1885–119), Port Famine and with a red printed 841 [= 1841].

Other Diptera described from Port Famine but lacking a specific number are referred here although Darwin's entry is in the singular. See also entry 1749.

Anisopodidae: *Anisopus fuscipennis* Macquart (Edwards, 1930: 118), two in the BM (1885–119).

Tephritidae: *Trypanea nigriseta* Malloch (1933: 283), one in the BM (1863–44).

Muscidae: *Euphaonia fulvohumeralis* Malloch (1933: 340), one in the BM (1863–44).

1842. Lepidop. Cape Negro.

The following moths described from 'Port Famine' must refer here.

Lasiocampidae: *Amydona humeralis* Walker (1855: 1413) (= *Trabala*), one in the BM (1846–38).

Geometridae: *Cidaria opprestata* Walker (1863: 1731), no specimen found. *Larentia esuriata* Walker (1863: 1702), one in the BM (1846–38). *Marcodava egenaria* Walker (1863: 1745), one in the BM (1846–38).

Doubleday (1848) records three Darwin butterflies from Port Famine: Pieridae, *Pieris* (p. 9); Satyridae, *Chionabas* and *Erebia* (p. 31). My colleague R. I. Vane-Wright has located these in the BM collections as follows: *Tatochila theodice gymnodice* Staudinger (Pieridae), one female, Pt Famine (BM 1846–38) and with red label numbered 842 [= 1842]. *Argyrophorus williamsianus* Butler (1868: 159, pl. 4, fig. 1) (= *Stuardosatyrus*), one male, Pt Famine (BM 1846–38) (see Herrera & Etcheverry, 1965, *Publnes Cent. Estud. ent. Univ. Chile* **7:** 74); *Tetraphlebia? plumbeola* Butler (1868: 95, pl. 2, fig. 11) (= *Cosmosatyrus leptoneurodes plumbeola*), one male, Pt Famine (BM 1846–38) (see Herrera & Howarth, 1966, *Publnes Cent. Estud. ent. Univ. Chile* **8:** 78).

Vane-Wright also located another Darwin butterfly: Nymphalidae, *Argynnis cytheris* Drury, one male, Pt Famine (BM 1946–38). This is the specimen cited by Hall (1906–1919, Last notes, Book 1, microform sheet 168: 104) with the comment '*darwini* is treated as a synonym and there is a specimen from Port Famine taken by Darwin himself'. *Argynnis darwini* Staudinger is included in the eponyms section and Vane-Wright tells me it represents a distinct species (now = *Issoria lathonioides* (Blanchard)).

1843. Bee P. Famine.

HYMENOPTERA: no specimen found.

1910. Sphodrus, with four indistinct orange spots (March) on elytra; under dead bird sea coast. E. Falkland Id.

COLEOPTERA, Carabidae: *Lissopterus quadrinotatus* Waterhouse, G. R. (1843: 281–2), two in the BM (1845–63), E. Falkland.

1911. Catops. under old dead calf: far in country.

COLEOPTERA, Leiodidae: *Choleva falklandicus* F. (Waterhouse, F. H., 1879: 531) (Champion (1918*a*) places this in *Catops*) (= *Falkocholeva cribellata* F. & G.), two in the BM (1879–34), Falkland Is. and E. Falkland.

1912. Curculio, in berry of Tea plant.

COLEOPTERA, Curculionidae: *Falklandius turbificatus* Enderlein (Champion, 1918*a*), three in the BM (1885–119). See also entry 1151.

1999. Fly. under dead birds, sea-beach from Falkland Islands.

DIPTERA, Helcomyzidae: *Paractora trichosterna* (Thomson) (Malloch, 1933: 331), one in the BM (1885–119) with a red printed 999 [= 1999], and another (1863–44).

2002. Coleoptera, high up, St Cruz river all the Carabidous and Staphylini under stones on the beach.

Carabidae: *Bembidion* sp., seven in the BM (1885–119), St Cruz, one numbered 2002 but are obviously all the same series. *Trechisibus australis* Jeannel, subsp. *patagonicus* Jeannel: two in BM numbered 2002 (see Jeannel, 1927).

Coccinellidae: *Eriopis* sp., one in the BM (1885–119), St Cruz, numbered 2002.

Dytiscidae: *Colymbetes reticulatus* Babington (1842: 5) (= *Lancetes varius* F.), two in the BM (1873–8), St Cruz, numbered 2002.

Staphylinidae: no specimen found.

HEMIPTERA–Heteroptera, Corixidae: *Ectemnostega darwini* Hungerford (1948: 203), one in BM (1885–119) numbered 2002.

2049. Curculio lying dead by thousands on all parts of plains; interior, **both** far up and **on sea coast** St Cruz. April.

COLEOPTERA, Curculionidae: *Cylydrorhinus angulatus* Guérin (?) (Waterhouse, G. R., 1842*b*), three in the BM (1863–44, 1875–36), St Cruz, one with a green printed 49 [= 2049]. See also entry 1750 (Waterhouse included Port St Julian).

2050. 2051. 2052. Curious Heteromerous insects, [continued].

1834 April Insects St Cruz 17.

[continued] (2050 and 2051) far up the country, ['quite original' crossed out by Darwin] **where no white man probably every before arrived.**

COLEOPTERA, Tenebrionidae: *Cerostena punctulata* Waterhouse, G. R. (1842*b*: 120) (= *Psectrascelis*), one in the BM (1863–44), St Cruz). *Nyctelia guerini* Waterhouse, G. R. (1842*b*: 114), one in the BM (1863–44), St Cruz *N. stephensii* Waterhouse, G. R. (1842*b*: 113), two in the BM (1863–44), St Cruz, *N. sulcicollis* Waterhouse, G. R. (1842*b*: 115) (= *Psectrascelis*), one in the BM, St Cruz and a green printed 52 [= 2052].

2053. Lamellicorn, lying dead in great numbers; interior probably feed on Guanaco dung.

COLEOPTERA, ?Scarabaeidae: no specimens found.

The guanaco (*Lama guanacoe*) is a llama of the southern plains of South America; see also entry 1716.

2054. Galeruca; a tribe very rare in such countries.

COLEOPTERA, Chrysomelidae; Galerucinae. No specimen found.

2055. Fly feeding on a Phallus.

DIPTERA: no specimen found.

The only *Phallus* (fungus) described by Berkeley (1842*a*) was from Maldonado.

[Darwin has ruled a line across the page to separate these entries and inserted Chiloe]

Chiloe

(a) 2102. Earth-bulls [*sic* for balls]

[on verso] (a) 2102. Geotrupes. This insect is excessively abundant, borring [sic] deep holes beneath every heap of horse dung (and once I saw sheeps). Curious instance of increase in number and change of habit no large quadrupid [sic] in Chiloe. At the depth of 2 and 3 feet. balls of earth, lined with a darker kind, (dung?) containing larva are very commonly found, in Gardens (where dung is not directly present); from what I can hear, I have little doubt that no other beetle than the Geotrupes, exists in numbers proportionate to the balls. I saw a man dig up 10 or 12 in a few minutes.

When first found they are not quite so hard as at present. The larva of many had eaten their way out and had escaped.

COLEOPTERA, Scarabaeidae: *'Phanaeus'*, no specimen found. This beetle is so recorded by Darwin in the *Journal* (1845: 490) where he says 'on the opposite side of the Cordillera in Chiloe, another

species of Phaeneus is exceedingly abundant, and it buries the dung of the cattle in large earthen balls beneath the ground. There is reason to believe that the genus Phanaeus, before the introduction of cattle, acted as scavengers to man'.

Darwin develops this theme in this long footnote on dung beetles in general. (See also entries 1491, 3506, 3819).

2107. 2108. Geotrupes.

COLEOPTERA, Scarabaeidae: *Pinotus torulosa* Eschscholtz, two in the BM (1887–42), one with a green printed 108 [=2108]

2109. Carab. Bemb. in moss.

COLEOPTERA, Carabidae: *Bembidion* sp., one in the BM (1887–42), 'Valparaiso', and with a green printed 109 [=2109].

2110. [2]111. The great curious Lucanus; given me by Mr R. Williams; caught when flying about in summer. The male insect is said to make a very loud clacking noise with its horns, when molested or even approached; is not very uncommon; is found abundantly in Mainland near Valdivia. In end of Jany, found 3 females, flying about during the day; when touched, stood on four hind legs, and raised their head, as in battle; very strong; caught male at Valdivia; fought most boldly, turning round to face enemy; the noise alluded to, is not very loud, and produced by friction of abdomen, when even frightened, but not touched; jaws not so strong as to produce pain to finger.

Mr Douglass, sent me 12 specimens of this fine insect and the following account: 'I found them in the crutch of an Atenihue tree, thirty feet above the ground, in a nest of moss. I was led to the spot by following one of them morning and evening for several days and always lost sight of it near this tree. I at last climbed up the tree and discovered them as mentioned. This is in the Island of Cancahue.'

Chiloe
(1835)

COLEOPTERA, Lucanidae: *Chiasognathus grantii* Stephens, two in the BM (1837–1, 1837–2).

Darwin collected 12 specimens which he forwarded to Cambridge (Babington 1837, Westwood 1837). Darwin (1871: vol. 1, 377, 384) writes at some length on this species in the *Descent* (chapter 10, Sexual Selection) and in correspondence with H. W. Bates (Stecher, 1969: 113) says 'I heard in Chile *Chiasognathus Grantii* squeaking loudly so I wd gladly pay £1 for a pr, if they can be bought: I brought home a dozen sp. T. but gave them all away'. A reply from Bates indicates that the dealer E. W. Janson had promised to try to obtain specimens.

1834 *July* *Insects* *18.*

2137. 2138. Heterom. Coleoptera. Pt St Julian.

Tenebrionidae: *Nyctelia angustata* Waterhouse, G. R. (1842*b*: 116) (= *N. brunnipes* Latreille), one in the BM (1863–44) described from 'Patagonia' probably refers here. *N. newporti* Waterhouse, G. R. (1842*b*: 113), was doubtfully recorded from St Julian. See also entry 1751.

2139 Cicada, very abundant, uttering shrill cry on the plains of Patagonia. Pt Desire &c.

2152a) [on verso] **a) (2152) Pulex from Didelphis (2204)**
2153 **(2153) Ricinus from a Condor.—**

(2139) HEMIPTERA–Homoptera, Cicadidae: no specimen found. Darwin (1871; vol. 1, 350) makes reference to Cicada song in the *Descent* (chapter 10, Sexual Selection) as follows: 'The noise thus made could be plainly heard on board the "Beagle" when anchored at a quarter of a mile from the shore of Brazil; and Captain Hancock says it can be heard at the distance of a mile'. There is no entry for Cicada in the Brazilian section of the notes and the recollection may refer to this entry. See also entry 2507.

(2152) SIPHONAPTERA: no specimen found but F. G. A. M. Smit suggests that this opossum flea was possibly a *Polygenis* sp. Four species of *Didelphis* (opossums) are included in the *Zoology* (Darwin, 1839: pt. 2, 93–7).

(2153) PHTHIRAPTERA: in the Denny collection at Oxford are three unidentified specimens on a card, from a condor, with green printed 153 [=2153]. The host is the condor (*Vultur gryphus* L.) and is treated in the *Zoology* (Darwin, 1841: pt. 3, 3).

2158. Coleoptera. Onthoph: under stones not dung feeder; rolls up like armadillo.

?Histeridae: *Onthophilus*, no specimen found.

2209 . . . 2213. Coleoptera under stones on mountains, valley of Aconcagua.

Carabidae, tribe Agonini: one in the BM (1887–42), Valparaiso, with a green printed 210 [=2210]. *Feronia (Poecillus) chaudoiri* Guérin. (Waterhouse, G. R., 1841*b*) (=*Pterostichus*), one in the BM (1884–119), S. America, with green printed 209 [=2209], see also entries 3201 for this species.

2214. Serica flying about in evening great (August) numbers. 5000 feet, elevation:— **on the** Campana of Quillota, **which is** 6200 feet.

COLEOPTERA, Scarabaeidae: no specimens found.

2215. Dromius, under dead bark, foot of Andes.

COLEOPTERA, Carabidae: no specimen found.

2216. Harpal. Hab. Do.

COLEOPTERA, Carabidae, Harpalinae: six in the BM (1887–42), Valparaiso, may refer here. See also entry 2776.

2217. Septaira, under stones, brook valley of Canguenes, high up. [Entry struck out—not entomological].

2218. Colymbetes, rapid brook. Hab. Do.

COLEOPTERA, Dytiscidae: *Colymbetes chiliensis* Laporte (Babington, 1842) (=*Lancetes nigriceps* Erichson), two in the BM (1863–44). Valparaiso. *C. punctum* Babington (1842: 10) (=*Leuronectes gaudicaudi* Laporte), five in the BM (1863–44), Valparaiso. *C. reticulatus* Babington (1842: 5) (=*Lancetes varius* F.), one in the BM (1863–44), Valparaiso. *C. suturalis* Babington (1842: 6) (=*Rhantus signatus* F.), one in the BM (1863–44), Valparaiso.

2219. Coleoptera, flying about in evening, 4000 feet elevation, Campana of Quillota.

No specimen found. See also entry 2214.

2303. 2308. Coleoptera, Diptera &c; all the latter and most of others taken by sweeping in the month of October, Valparaiso.

COLEOPTERA, Coccinellidae: *Adalia deficiens* Mulsant (Babington, 1842). *Coccinella fulvipennis* Mulsant (Babington, 1842), one in the BM (1887–42), Valparaiso.

Curculionidae: *Adioristus angustatus, A. conspersus, A. punctulatus* and *A. simplex*, all described by Waterhouse, G. R. (1842*b*: 124–6) from 'Valleys at Petorca', may refer here. The specimens marked 'type' in the BM have, at first glance, no clear connection with Darwin but the accession numbers 1875–36 on some refer to types presented by Waterhouse to the Beetle section. The types of *A. punctulatus* and *A. angustatus* bear accession numbers 1908–158 and 'formed part of Mr Bridges collection in Mr Bond's collection sold at Stevens auction 12.xii.07 and purchased from Mr O. Janson 26.v.08'. All four species appear under the original accession number (1875–36) in the Register!

Lathridiidae: one in the BM (1885–119), Valparaiso.

Melyridae: *Astylus gayi* Guérin (Champion, 1918*c*) may refer here, see also entry 2773.

Tenebrionidae: *Grammicus chilensis* Waterhouse, G. R. (1845*b*: 324, gen. et sp.), two in the BM (1845–118, 1885–119), Valparaiso.

DIPTERA, Sarcophagidae: *Sarcophaga* sp., one in the BM (1885–119).

HEMIPTERA, Henicocephalidae, one in BM labelled Valparaiso.

HYMENOPTERA, Pteromalidae: *Asaphes aenea* Nees (Walker, 1846: 23). Also the following Chalcidoidea (Walker, 1842*a*: 113–116): *Asaphes vulgaris, Callimome eumelis, C. nonacris, Entedon bedius, E. flacilla, Eulophus rhianus, Lamprotatus caecina, Lyrcus origo, Pteromalus gryneus, Tetrastichus polybaea, T. scadius, Torymus phormio*. See also entry 2776.

2317. Hister, under dry human dung abundant. **The red spots were much brighter** [presumably Darwin means in life].

COLEOPTERA, Histeridae: No specimen found.

2318. Gonoleptes, certainly from West coast, of S. America, but I cannot find out what part, given to me.

?Arachnida, spider—not an insect.

2323. Curculio. First appears in November. Very abundant, injurious to young shoots of plums and peaches; this is time of year when many Lamellicorn beetles, first appear **Valparaiso.**

COLEOPTERA, Curculionidae: *Lophotus eschscholtzi* Schoenherr (Waterhouse, G. R., 1840*b*), no specimen found in the BM, but the species would now be placed in the genus *Aegorhinus*.

2325. Lamellicorn **Do: Flying in numbers round the young peach trees, first appeared in first week of November.**

COLEOPTERA: no specimen found, but *Brachysternus castaneus* Guérin (Scarabaeidae), listed in the BM accessions book under 1845–63, may refer here.

2326. Coleoptera, in Fungus Decemr. Archipelago of Chiloe.

No specimen found.

2327. Blue Carabus, under logs of wood in the forest. Island of Lemuy. I notice all the [continued].

1834 *Insects* *Archipelago of Chiloe* *19.*

[continued] blue ones are males and coppery ones females, yet surely they are different species; do not Carabi, abound in one sex at one period. Emit a powerful acrid fluid, and smell like some of the Heteromerous insects very disagreeable and powerful.

COLEOPTERA, Carabidae: *Carabus darwinii* Hope (1838: 129) (subgenus *Ceroglossus*), one in the BM (1863–44) Chiloe. See section on eponyms for Hope's dedication and other comment. See also entries 2328, 2329, where it can be seen that different species were involved though it appears that Darwin collected more specimens than have survived.

2328. Carabus, far more common same Hab. and locality.

COLEOPTERA, Carabidae: *Carabus insularis* Hope (1838: 129), one (bluish-black) in the BM (1863–44) with green printed label 328 [= 2328] (s.g. *Ceroglossus*, as a variety of *C. valdiviae* Hope). See also entries 2327, 2329, 2520, 2914.

2329. Brighter variety (?) different locality.

COLEOPTERA, Carabidae: *Carabus chiloensis* Escholtz (Hope, 1838) (s.g. *Ceroglossus*, as variety of *C. valdiviae* Hope), the only specimen found in the BM (as *chiloensis* Hope) is labelled Valdivia. See entry 2520.

2330. Carab: Harpal same habitat and locality.

COLEOPTERA, Carabidae, Harpalinae: no specimen found.

2331. Heterom. rotten wood.

COLEOPTERA: no specimen found.

2332. Do. under stones near beach

COLEOPTERA: no specimen found.

2333. Carab. Harpal. very abundant.

COLEOPTERA, Carabidae, Harpalinae: no specimen found.

2338. Elmis. small stream, under stone. Various parts, east coast of Chiloe.

COLEOPTERA, Elmidae: *Elmis chiloensis* Champion (1918*b*: 48), four in the BM numbered 2338.

2367.... Coleoptera Diptera &c. &c. collected by sweeping the bushes and
... 2372 some from a Fungus. The whole country is one great forest.

COLEOPTERA, Carabidae: *Bembidion* spp., three in the BM (1887–42), Chili and numbered 2367. [Tribe Agonini det. N.E. Stork], four in the BM (1887–42), Chili and numbered 2367. Subfamily Harpalinae, four in the BM (1887–42), Chili and numbered 2367.

The following Carabidae are also included here though lacking specific numbers: *Antarctia circumfusa* Germar, one in the BM (1880–43) (det. Straneo); *Cascellius aeneo-niger* Waterhouse, G. R. (1840*c*: 256), two in the BM (1863–44); *Feronia (Pterostichus) bonellii* Waterhouse, G. R. (1841*b*: 123); *F. (Argutor) chilensis* Dejean (Waterhouse, G. R., 1841*b*: 129), one in the BM (1863–44); *F. nebroides* Curtis (Waterhouse, G. R., 1841*b*: 124); *Metius flavipes* Dejean (Straneo, 1951: 63) (= *Antarctia*), two in the BM (1885–119); *M. femoratus* Dejean (Straneo, 1951: 63) (= *Antarctia*), one in the BM (1880–43, wrong number); *M. ovalipennis* Straneo (1951: 71, 80) (= *Antarctia*), one in the BM (1880–43, wrong number), standing over an *Antarctia chilensis* Dejean label.

Cerambycidae: *Callisphyris macropus* Newman (1840: 1), *Hephaestion macer* Newman and *H. ocretus* Newman (both 1840: 10) may refer here, all described from Chiloe. Darwin has usually made separate entries for the Cerambycidae but none fit these specimens (see entries 50, 62, 76, 81, 101, 127, 133). See Fig. 18.

Chrysomelidae: *Aulonodera darwini* Champion (1918*b*: 51, gen. et sp.). *Strichosa eborata* Blanchard, two in the BM (1885–119), Chiloe, one numbered 2368. *Longitarsus chiloensis* (Bryant, 1942: 104) may also refer here. *Crepidodera chiloensis* Bryant (1942: 104), one in the BM (1885–119), numbered 2368.

Coccinellidae: *Stictospilus darwini* Brèthes (1924: 153 genus, 154 species), two in the BM (1885–119), numbered 2369. *Orynipus darwini* Brèthes (1924: 158), one in the BM (1885–119) and numbered 2368.

Colydiidae: *Philothermus cribricollis* Champion (1918*b*: 48), four in the BM numbered 2369.

Curculionidae, Leptopiinae: three in the BM numbered 2369, 2372, plus one *Dasydema hirtella* Blanchard in BM (1885–119) Chiloe, numbered 2368. There is also one unidentified specimen (BM 1887–42) of Baridinae.

Hydrophilidae: *Enochrus* sp., one in the BM (1885–119) numbered 2367. There are also two *Enochrus* spp. in Cambridge, but see entries 875, 1314.

Languridae: one in the BM (1885–119), Chiloe and numbered 2731, certainly an error for 2371.

Lathridiidae: seven in the BM (1885–119), Chiloe, numbered 2368 (1), 2369 (2) and 2371 (4).

Passandridae: *Catogenus decoratus* Newman (1839: 303) may refer here, one in BM (63.44) labelled 'Type' and on blue paper 'South of Chile, C. Darwin'. Described from Chiloe 'in the cabinet of Mr Melly'.

Silphidae: *Micragyrtes ocelligerus* Champion (1918*b*: 46, gen. et sp.), two in the BM numbered 2369. *Hydnobius forticornis* Champion (1918*b*: 47), one in the BM numbered 2369.

Staphylinidae: *Polylobus darwini* Bernhauer (1935: 96), one in the BM (1885–119) and numbered 2371.

DIPTERA. Some 120 specimens of unidentified Diptera are present in Dublin numbered 2368, 2369, 2523 and the following families are represented.—Agromyzidae, Calliphoridae, Ceratopogonidae, Chironomidae, Chloropidae, Clusiidae, Dolichopodidae (*Sympycnum* and *Somillus*), Empididae, Ephydridae (*Hydrellia* and *Notiphila* spp.), Lauxaniidae, Micropezidae, Muscidae, Mycetophilidae, Phoridae, ?Piophilidae, Rhagionidae, Sciaridae, Sciomyzidae, Sphaeroceridae, Stratiomyidae, Tephritidae, Tipulidae. Of these the most interesting is the Dolichopodid genus *Somillus* (= *Ionthodophrys*) (det. C. E. Dyte) which was originally described as an Acalyptrate.

HEMIPTERA: there are eight unidentified Homoptera in Dublin and ten Psyllidae in the BM (1885–119) accessions.

HYMENOPTERA: the following Chalcidoidea were described by Walker (1839) on the pages indicated.

Eurytomidae. *Eurytoma philager* (81).

Lamprotatidae. *Lamprotata nages* (83), *L. eleus* (85).

Pteromalidae. *Pteromalus protheus* (87), *P. mydon* (87), *P. traulus* (88), *P. rhaeo* (88), *P. vulso* (89).

Eulophidae. *Lophocomus anaitis* (91), *Elachestus gyes* (89), *Eulophus laonome* (90), *Tetrastichus xenocles* (90).

These probably all refer here but no attempt has been made to locate them in the BM collections. Little work has been done on this difficult group from these regions since Walker's day and the labour involved in interpolating Walker's work would merit only specialist attention for revisionary purposes (see Notes on Walker).

In Dublin there are about 20 small unidentified Hymenoptera from Chiloe.

2376. Elater. from considerable height. St Pedro [San Pedro Island at the S.E. extremity of Chiloe].

COLEOPTERA, Elateridae: *Elater luteipennis* Guérin, one in the BM (1845–63), Chiloe.

2414. Lampyrus? the genus to which this insect belongs, is in number of individuals and, species the most abundant kind in Chiloe and Chonos **Archipelago.**

COLEOPTERA, Lampyridae: no specimen found.

2415. Curculio (of Tierra del Fuego?) St Andrews Cape Tres Montes.

COLEOPTERA, Curculionidae: *Antarctobius lacunosus* Fairmaire (Champion, 1918*b*) (= *Listroderes*). See also entry 908.

2416. Locality. Do. Carab in rotten wood, high up on hilly forest.

COLEOPTERA, Carabidae: no specimen found.

2417. Curculio, Locality and Hab. same.

COLEOPTERA, Curculionidae: no specimen found.

2418. Harpal, under log of wood Locality Do.

COLEOPTERA, Carabidae: *Antarctonomus peroni* Chaudoir (Champion, 1918*b*), one in the BM (1885–119), Tierre del Fuego and labelled with green 418 [= 2418]. Clearly there is a labelling error here but the species also occurs in Tierra del Fuego (see entries 906, 1049).

2419. Bee. Midship Bay Chonos.

HYMENOPTERA: no specimen found.

2420. Libellula. East coast of Chiloe.

ODONATA: No specimen found.

2424. Coleoptera. thick forest **Chonos Arch:** In the very thick (Crytogamic [*sic* = Cryptogamic] flora) damp forest, [continued]

1834 December Insects Archipelago of Chonos 20.

[continued] Pselaphidae and small Staphylinidae the most abundant insects.

No specimens found, but in the *Journal* Darwin (1845: 286, footnote) records 'By sweeping with my insect-net, I procured from these situations a considerable number of minute insects, of the family Staphylinidae, and others allied to Pselaphus, and minute Hymenoptera. But the most characteristic family in number, both of individuals and species, throughout the more open parts of Chiloe and Chonos, is that of the Telephoridae'.

The comment on Telephoridae (= Cantharidae) is strange as this family is absent from Darwin's collections (though not from the Region) and notes. This may be a slip for Tenebrionidae to which most 'Heteromera' references allude.

2438. Fly. bred from the soft putrid kelp on the coast of Tres Montes. I never saw such immense numbers in clusters under side of stones.

DIPTERA: no specimen found. The true 'kelp-flies' of the family Coelopidae are not known to occur south of Mexico and this fly would probably be a *Paractora* sp. (see entry 1999) (Helcomyzidae) or a *Fucellia* sp. (Anthomyiidae).

2444–2455. Insects, from under stones at an elevation of 2500 feet, bare Granite mountain Patch Cove North part of Tres Montes 2444, 2446. Curious Hemipterous insects; it may be remarked there are 3 species of Curculio. The Elater in numbers were far most abundant; this

is a good example of The Alpine **Entomology of this part**; for I **sedulously** turned up **very many** stones; Libellula 2455 from base of mountain [clearly Syms Covington had been unable to interpolate Darwin's writing in the original Notebooks and had left spaces here for Darwin's insertions].

COLEOPTERA, Carabidae: *Bembidiomorphum convexum* Champion (1918*b*: 44, 45), one in the BM (1885–119), Tres Montes with green printed 449 [=2449].

Curculionidae: *Antarctobius laticauda* Champion (1918*b*: 54), one in the BM (1885–119) with green printed label 453 [=2453] (now placed in *Telurus* Juschel).

Tenebrionidae: *Parahelops darwini* Waterhouse, C. O. (1875: 334), one in the BM (1875: 35), 'Tierra del Fuego' but with a green printed 454 [=2454].

HEMIPTERA. These may be the two Cambridge Pelogonidae referred to entry 677 but the above habitat hardly sounds suitable for semi-aquatic species.

2462. Carab. Trechus Yuche Island **in the** forest [a little to the N of Tres Montes].

COLEOPTERA, Carabidae: *Cascellius kingii* Curtis (Waterhouse, G. R., 1840*c*), no specimen found. *C. gravesii* Curtis (Waterhouse, G. R., 1841), no specimen found. *Feronia (Pterostichus) bonellii* Waterhouse, G. R. (1841*b*: 123), no specimen found. *F. rufipalpis* Curtis (= *Pterostichus chalybicolor* Chaudoir), one in the BM (1863–44), Yuche I.

2463. Curculio. Do. Do.

COLEOPTERA, Curculionidae: *Lophotus nodipennis* Hope (Waterhouse, G. R., 1840*b*), one in the BM (1863–44) probably refers here.

2474. Coronula from whale, Chonos Archipelago Jany 1835 [crossed out? by Darwin—not entomological].

2482. 2483. 2484. Coleoptera from B[ahia] Blanca Patagonia.

Carabidae: *Calosoma patagoniense* Hope (1838: 129), one in the BM (1863–44) with green printed 484 [=2484]. See also entry 862 for this species.

2485. Acari (black) under stones and on putrid vegetable matter on beach in immense numbers. **Chonos Archipelago**

Arachnida—not an insect.

2486. Fly (biting my flesh). **Do.**

DIPTERA: no specimen found.

2497. Fly. on coast Lowes Harbour. **Do.**

DIPTERA: no specimen found.

2505. 2506. Coleoptera, in dense forest. **Do.**

No specimens found.

2507. Cicada. **Do.**

HEMIPTERA-Homoptera, Cicadidae: no specimen found.

2508. Carab: young. **Do.**

COLEOPTERA, Carabidae: no specimen found.

2509. Diptera. Hymenoptera. Coleoptera, all the above insects, taken on borders of wood by sweeping, Lowes Harbour. **Do.**

DIPTERA: many of the miscellaneous unidentified flies in Dublin from Chiloe, etc. may refer here, but they lack precise data.

HYMENOPTERA: the following Chalcidoidea described from 'Isle of Chonos' by Walker (1843*c*: 184–5) must refer here.

Lamprotatidae: *Lamprotatus numitus*.

Pteromalidae: *Pteromalus ?oxynethes*.

Eulophidae: *Entedon ufens*, *Closterocerus pelor*.

See comments on Hymenoptera under entries 2367–2372.

COLEOPTERA: no specimens found.

2520. Carabus, Centre of Chiloe, in forest **at level** of water; all [what looks like small figure 3 here] under one log of wood [continued].

1835 Jany Insects [Chonos Archipelago crossed out] *21.*

[continued] It is remarkable that the same variety (2329) is also a female and was equally found low down; is it distinct species?

COLEOPTERA, Carabidae: *Carabus chiloensis* Escholtz (Hope, 1838) (s.g. *Ceroglossus*), ?See entry 2329.

2521. Glow-worm. Centre of Chiloe.

COLEOPTERA, Lampyridae: ?larva, no specimen found.

2523. Insects, sweeping, Chiloe.

COLEOPTERA, Chrysomelidae: *Crepidodera chiloensis* Bryant (1942: 104), one in BM (1885–119) numbered 2523 (see also 2368).

Curculionidae. *Rhopalomerus tenuirostris* Blanchard (det. R. T. Thompson), one in the BM (1887–42) and numbered 2523.

For the Diptera, Hymenoptera and Hemiptera see comments under entry 2367. Dublin material definitely referable to this day's collecting and bearing numbers 2523 handwritten on small yellow labels are:

DIPTERA: Chloropidae, Empididae, Ephydridae (*Notiphila*, det. B. H. Cogan). In the BM accessions there are also two unidentified Chloropidae (Diptera) numbered 2523.

HEMIPTERA–Homoptera, Aetalionidae: *Melizoderes darwini* Funkhouser (1934: 203), two in BM (1885–119) numbered 2523.

Delphacidae: *Delphacodes chiloensis* and *D. darwini* Muir (1929: 78, 79), one of each in BM (1885–119), Chiloe, the latter numbered 2523.

Psyllidae: *Notophorina* sp. (det. D. Hollis), one in BM (1885–119) labelled Chiloe and numbered 2523. There are also unidentified Hemiptera of the families Cicadellidae, Lygaeidae and Miridae in BM accessions drawers.

2524. 2525. Flys [sic] which bite both men and horses the first especially abundant; Chiloe.

DIPTERA, Tabanidae: *Tabanus (Stypommia) anachoreta* Philippi (Kröber, 1930: 140) (= *Dasybasis* s.g. *Agelanius meridiana* Rondani), one in the BM (1885–119), E. Chili, certainly belongs here as two other non-Darwin specimens are from Chiloe.

It is possible that the Tabanid-like *Pelecorhynchus darwini* Ricardo (1900: 102) (family Pelecorhynchidae) is the second fly here as there is a specimen from Chiloe (BM 1885–119) and no other Darwin material fits here. However this species is a nectar-feeder and does not bite.

See also entries 1716, 2486, 2569.

2544. 2 Beetles from, either Cacao or Sugar, on board.

COLEOPTERA: no specimen found.

2545. Insects from S. Carlos de Chiloe.

?Order, no specimens found.

2546. Meloe, common. crawling about grass and flying about, Cudico, S. of Valdivia. The Padre told me, that the Indians use this as a poison, and likewise apply it as a caustic **or Blister.**

COLEOPTERA, Meloidae: no specimen found.

2557. 2558. 2559. Insects, sweeping, in and on borders of forest. Valdivia.

HYMENOPTERA: I refer here the Chalcidoidea described by Walker (1842*b*) as most likely to have been collected by sweeping: *Closterocerus xenodice, Dicyclus lynastes, Inostemma quinda, Lamprotatus bisaltes, L. natta, L. orobia, Pachylarthrus sariaster, Platygaster paches, Pteromalus megareus, Romilius zotale.*

2561. Pediculi. vide **p.** 315 and Pulex. The Fleas may be compared with some I collected at St Fe.

PHTHIRAPTERA: in the Denny collection at Oxford is a card mount of four unidentified lice bearing a green printed 564 [= 2564]. See also entries 1185 in *Spirits of Wine List* (the page reference is to the *Zoological Diary* which is cited under that entry).

SIPHONAPTERA. *Pulex irritans* L., female, Chiloe Island. In the Denny collection, Oxford. The other human flea referred to is under entry 758 and other flea entries are 376, 790, 2152, 3200. However, this is the only Darwin flea found.

2569. Fly which together with (2524–2525) torments man and horse in forest of Chiloe.

DIPTERA: no specimen found, but see 1716, 2524, 2525.

2596. 2597. Heterom. Sand dunes. Concepcion.

COLEOPTERA: no specimens found.

2764 **to** 2772 Small insects from Concepcion. S. C.

(a) [verso] **(a) Insects of Coquimbo and Valparaiso taken in the winter, those of Concepcion in the Autumn.**

COLEOPTERA, Carabidae: *Antarctia femorata* Dejean, one in the BM (1880–43). Concepcion (= *Metius*, see Straneo, 1951: 67). *A. euryptera* Putzeys, one in BM (1885–119) (det. Straneo, 1950). *Feronia nebroides* Curtis (Waterhouse, G. R., 1841). *F. (Steropus) marginata* Waterhouse, G. R. (1841*b*: 124), one in the BM (= *Pterostichus blandus* Er., det. S. L. Straneo). *Metius flavipes* Dejean (Straneo, 1951: 63). Subfamily Harpalinae: four unidentified species in BM (1887–42).

Coccinellidae: *Eriopis 16-pustulata* Brèthes (1924: 149) (= *E. connexa* Germar), one in the BM (1885–119).

Lathridiidae: two unidentified species in the BM accessions (1887–42), Concepcion, numbered 2770, 2772.

Melyridae: *Astylus gayi* Guérin (Champion, 1918*c*) may refer here.

DIPTERA, Empididae: *Platypalpus* sp. (det. K. G. V. Smith), one in the BM (1885–119).

Ephydridae: *Scatella vulgata* Cresson (1933: 108), one in the BM (1863–44), numbered 2770).

Pipunculidae: *Pipunculus posticus* Collin (1931: 59).

Sphaeroceridae: *Leptocera (Limosina) darwini* Richards (1931: 80), one in the BM (1885–119), labelled 2772.

HYMENOPTERA, Walker (1843*a*: 30–32) describes the following Chalcidoidea: *Lamprotatus alcander* (p. 30), *Gastrancistrus cephalon* (p. 30), *Pteromalus calenus* (p. 31), *Derostenus alcetas* (p. 31), *Closterocerus cercius* (p. 31), *Bellerus anaitis* (p. 32), *Tetrastichus naucles* (p. 32), *T. norax* (p. 32). See comments on Walker's Hymenoptera under entries 2367–2372.

2773. 2774. 2775. Small insects Coquimbo. S. C.

COLEOPTERA, Carabidae: *Antarctia latigastrica* Dejean, one in the BM, Coquimbo. *Feronia (Steropus) marginata* Waterhouse, G. R. (1841*b*: 124), one in the BM (1885–119), Coquimbo (= *Pterostichus blandus* Er. det. S. L. Straneo, 1950).

Coccinellidae: *Eriopis connexa* Germar (= *E. 16-pustulata* Brèthes), one in the BM (1885–119) (see also entry 2764).

Curculionidae: *Listroderes costirostris* Schoenherr and *L. robustus* Waterhouse, G. R. (Waterhouse, G. R., 1842*b*: 122). *Pentarthrum* sp., pair in BM (1885–119), Coquimbo.

Lucanidae: *Sclerognathus femoralis* Guérin, one in the BM (1887–42) (= *Dorcus darwinii* Hope), see also entry 968. *Dorcus bacchus* Hope (= *Apterodorcus*), one in the BM (1887–42).

Melyridae. *Astylus gayi* Guérin (Champion, 1918*c*), see also entry 2303.

Scarabaeidae: *Trox bullatus* Curtis, one in the BM (1885–119).

Tenebrionidae: *Psectrascelis pilipes* Guérin (Waterhouse, G. R., 1842*b*), 'numerous' but only one in the BM (1885–119), Coquimbo. *Scotobius gayi* Solier, one in the BM (1885–119). *S. rugosulus* Guérin is listed in the BM Accessions register under 1845–63 but has not been found.

HYMENOPTERA, the following Chalcidoidea were described by Walker (1843*d*): *Gastriancistrus polles, Lamprotatus naevolus, L. tubero, Omaloderus affine, O. intrepidus, Platygaster sylea, Platyterma nephele, Pteromalus oenoe, P. rhoebus, P. toxeus, P. vitula, Tetrastichus narcaeus.*

2776. 2836. 2837. Do. Valparaiso. Do.

I have placed here unnumbered Valparaiso specimens unlikely to have been swept (see entries 2303, 2308).'

COLEOPTERA, Carabidae: *Bembidion* sp. (det. N. E. Stork), one in the BM (1885–119). *Feronia aerea* Dejean (Waterhouse, G. R., 1841*b*), one in the BM (1863–44). *F. chilensis* Dejean (Waterhouse, G. R., 1841*b*), no specimen found. *F. marginata* Waterhouse, G. R. (1841*b*: 124), five in the BM (1885–119) (= *Pterostichus blandus* Er., det. Straneo, 1950). *F. meticulosa* Dejean (Waterhouse, G. R., 1841*b*), one in the BM (1863–44). *F. nebroides* Curtis (Waterhouse, G. R., 1841*b*), no specimen found. *F. submetallica* Waterhouse, G. R. (1841*b*: 122), one in the BM (see also entry 1397). *Metius flavipes* Dejean (Straneo, 1951: 63) (= *Antarctia*), one in the BM. *M. ovalipennis* Straneo (1951: 71, 80) (= *Antarctia*), one in the BM (1885–119). *Odontoscelis substriatus* Waterhouse, G. R. (1840*a*: 359), one in the BM (= *Barypus*). *O. tentyrioides* Curtis (Waterhouse, G. R., 1840*a*). *Trechisibus femoralis* Germain and *T. politus* Brullé (Jeannel, 1927).

Tenebrionidae: *Callyntra vicina* Solier (Waterhouse, G. R. 1842*b*) (= *Epipedonota multicosta* Guérin). *Parahelops darwini* Waterhouse, C. O. (1875: 334).

2838. Lamellicorn. Island of S. Maria.

COLEOPTERA, Scarabaeidae: *Trox bullatus* Curtis, one in the BM (1887–42), Valparaiso.

2839. 2840. Insects. Copiapo.

No specimens found.

2841. Insects. Mendoza. Cicindela, Elmis. The Cicindela comes from the saline mud-banks of 'Rio Estacado; the Elmis and Colymbetes from the tepid and slightly mineral waters of Villa Vicencia in Cordilleras. The Cryptocephalus is Chilean insect.

COLEOPTERA, Carabidae: *Bembidion* sp. (det. N. E. Stork), one in the BM (1885–119), Mendoza

Curculionidae: *Adioristus subdenudatus* Waterhouse, G. R. (1842*b*: 126), Mendoza. These must refer here as they fit none of the other Mendoza entries for beetles, 2916, 2917.

2913. Bug mentioned by all authors, as so great a pest near Mendoza **&** in the **Traversias**; sucks very much blood, frequents houses; but this was [continued]

1835 *Insects* [Coquimbo—crossed out] *22.*

[continued] caught in sandy ravine of cordilleras of Copiapo; called Benchuca, caught in my bed.

HEMIPTERA, Reduviidae, Triatominae: *Triatoma infestans* Klug but no specimen found. See entry 3423 for a full account of the Benchuca.

2914. 2915. Insects. Valdivia.

COLEOPTERA, Carabidae: *Cascellius aeneo-niger* Waterhouse, G. R. (1840*c*: 256). *Carabus valdiviae* Hope (1838: 128) (s.g. *Ceroglossus*, see 2329). *Feronia bonellii* Waterhouse, G. R. (1841*b*: 123) (= *Pterostichus chalybicolor* Chaudoir).

DIPTERA, Syrphidae: *Valdivia darwini* Shannon (1927: 32), one in the BM (1885–119) (= *Valdiviomyia*).

2916. Heterom. high valleys of East cordilleras and **Traversia** of Mendoza.

COLEOPTERA, Tenebrionidae: *Entomoderes erebi* Solier (Waterhouse, G. R., 1842*b*), one in the BM (1848–95), Mendoza. *Epipedonota affinis* Waterhouse, G. R. (1842*b*: 118) (= *E. ebenina* Lacordaire, ssp. *affinis*), no specimen found. *E. erythropus* Solier, *Nyctelia erythropus* auctt (Waterhouse, G. R., 1842*b*). *E. rugosa* Waterhouse, G. R. (1842*b*: 118), no specimen found. *'Nyctelia nodosa* Latrielle, *Zophosis nodosa* Germar' (Waterhouse, G. R., 1842*b*) also 'Maldonado (La Plata) & Bahia Blanca' but no specimens found. *N. subsulcata* Waterhouse, G. R. (1842*b*: 110), one in the BM (1863–44), Mendoza.

2917. Lamellicorn, abundant Do. **Traversia.**

COLEOPTERA, Dynastidae: *Oryctomorphus pictus* Waterhouse, G. R. (1842*c*: 281), one in the BM (1845–63) may refer here.

3152. Locust v. private ground P. Mendoza.

ORTHOPTERA, Acridiidae: no specimen found. See entries 1329, 1330 for other Acridiidae.
In the *Journal* Darwin (1845: 329) records a swarm of locusts during his passage of the Cordillera, near Luxan. He says of the insects concerned 'This species of locust closely resembles, and perhaps is identical with the famous Gryllus migratorius of the East'.

3195. Insect (interesting) from the country near Callao. (**Peru**) [the sea port of Lima].

Order ? no specimen found, unless one of those under entry 3201 refers here.

3196. 3197. Male and female Crysomela [sic], about Lima. 1400 feet elevation, lower limit of winter vegetation. [Peru].

COLEOPTERA, Chrysomelidae: no specimen found.

3199. Prionus. Valparaiso (interior country).

COLEOPTERA, Cerambycidae: *Microcleptes aranea* Newman (1840: 11, gen. et sp.), 'resembles a small brown spider', one in the BM (1863–44), Valparaiso.

3200. Pulex (I believe irritans) (Callao) [Peru].

SIPHONAPTERA: the human flea, see entry 2561.

3201. Insects, sweeping, Callao.

COLEOPTERA, Carabidae: *Feronia eydouxii* Guérin (Waterhouse, G. R., 1840*c*) *Feronia peruviana* Dejean (Waterhouse, G. R., 1841*b*), two in the BM (1863–44). *F. (Poecillus) unistriata* Dejean (= *Pterostichus chaudoiri* Guérin), one in the BM (1863–44), Callao (see also entry 2209 for this species).

Dytiscidae: *Colymbetes saulcyii* 'Dufour ms in Hope Collection' (Babington, 1842: 9).

Tenebrionidae: *Melaphorus reichei* Guérin, one in the BM (1881–19, F. Bates) labelled 'Callao, C. Darwin' is numbered 1346. This number is not a Darwin number but refers to F. Bates' collection though none of the species described by him appear to include Darwin material (except 3561). See also entry 1751 for F. Bates material.

HYMENOPTERA. Chalcidoidea: the following were described by Walker (1843*b*): *Dicylus arduine, Entedon cleodora. Pachylarthyus cleodoxa, Pteromalus archia.*

3227. Buprestis. common between Guasco and Coquimbo.

COLEOPTERA, Buprestidae: no specimen found.

Galapagos Archipelago [inserted between two short lines by Darwin]

3228. Acarus, from great black sea Guano or Lizard. Galapagos—Chatham Island. September.

Arachnida, Acari—not an insect, see also entry 3240.

3229. Fly from Caracara Do. Do.

DIPTERA, Hippoboscidae: *Ornithomyia intertropica* Walker (1849: 1144) (= *Icosta nigra* Perty), three in the BM (1845–63), Galapagos Is. This 'Caracara' is *Buteo galapagoensis* Gould, the Galapagos hawk treated in the *Zoology* (Darwin, 1841: pt. 3, 23).

3230. 3231. 3232. Three Coleoptera, Heterom, under stones on hill. Do. [Chatham I. = San Cristóbal].

COLEOPTERA, Carabidae: *Feronia calathoides* Waterhouse, G. R. (1845: 21) is included here because the species is only recorded from here (Linsley & Usinger 1966: 141). Darwin's specimen is labelled 'Galapagos'.

Tenebrionidae: *Ammophorus galapagoensis* Waterhouse, G. R. (1845*a*: 30, gen. et sp.) 'under stones upon a hill in Chatham I.'. *Pedonoeces pubescens* Waterhouse, G. R. (1845*a*: 36) 'under stones on a hill on Chatham I. Sept'. *Stomion galapagoensis* Waterhouse, G. R. (1845*a*: 27 genus, 29 species), this must refer here; there is a specimen in the BM with a (white, should be yellow) printed 231 [= 3231].

HEMIPTERA–Heteroptera, Coreidae: *Anasa obscura* Dallas (1852: 505), described from 'Galapagos C. Darwin' is recorded from San Cristóbal by Linsley & Usinger (1966) and Froeschner (1985) and may refer here although no Hemiptera are mentioned by Darwin in this entry.

For Darwin's general comments on collecting in the Galapagos Archipelago see the *Journal* (1845: 391–2).

3240. Acarus, same as (3228).

Arachnida, Acari—not an insect.

3241. Acarus, from Pudenda of common great land Tortoise.

Arachnida, Acari—not an insect.

3245. Scolytus. branches of dead Mimosa **tree** Do. [Chatham I.] (long cavities, in whole length of bough, very numerous).

COLEOPTERA, Bostrichidae: *Apate* sp. (Waterhouse, 1845*a*) cites Darwin's data, Chatham I. (= *Amphicerus cornutus galapaganus* Lesne) (Linsley & Usinger, 1966: 151).

3246. Staphylinus, under dead bird. [Chatham I.]

COLEOPTERA, Staphylinidae: *Creophilus* sp. (Waterhouse, G. R., 1845*a*: 24) 'under dead bird', Chatham I. Linsley & Usinger (1966: 143) record *C. villosus* Gravenhorst from Chatham I.

3363. 3364. Small insects, sweeping high up, central parts of Charles Island. [= Floreana, = Santa Maria] October (Galapagos Is).

COLEOPTERA, Anthribidae: *Ormiscus variegatus* Waterhouse, G. R. (1845*a*: 37, genus, sp. & var. β), Darwin's data cited.

Carabidae: *Selenophorus galapagoensis* Waterhouse, G. R. (1845*a*: 22), see also Waterhouse, C. O. (1877). *S. obscuricornis* Waterhouse, G. R. (1845*a*: 22) may refer here though recorded only from Albemarle by Linsley & Usinger (1966).

Chrysomelidae: *Haltica galapagoensis* Waterhouse, G. R. (1845*a*: 39), later C. O. Waterhouse (1877: 80) erected the genus *Docema* to receive this species. *Longitarsus lunatus* Waterhouse, C. O. (1877: 81).

Coccinellidae: *Scymnus galapagoensis* Waterhouse, G. R. (1845*a*: 39), two in the BM (1845–63), Galapagos; (1877–1) Charles I. numbered 3363 (see also entry 3366).

Curculionidae: *Otiorhynchus cuneiformis* Waterhouse, G. R. (1845*a*: 38) (= *Amphideritus*).

Dytiscidae: *Copelatus galapagoensis* Waterhouse, G. R. (1845*a*: 23) may refer here although Linsley & Usinger (1966: 142) do not include Charles I.

Hydrophilidae: *Tropisternus lateralis* F. (Waterhouse, G. R. 1845*a*), see Blair (1933).

Phalacridae: *Phalacrus darwini* Waterhouse, C. O. (1877: 78), omitted by Linsley & Usinger (1966) and Linsley (1977).

Nitidulidae: *Acribis serrativentris* Waterhouse, C. O. (1877: 78, gen. et sp.) (= *Cybocephalus*), omitted by Linsley & Usinger (1966) and Linsley (1977).

Scarabaeidae: *Oryctes galapagoensis* Waterhouse, G. R. (1845: 26) may refer here.

Tenebrionidae: *Ammophorus obscurus* Waterhouse, G. R. (1845: 32) refers here (Blair, 1933). *Stomion helopoides* and *S. laevigatus* Waterhouse, G. R. (1845*a*: 30) may refer here.

DIPTERA: the following Diptera were not described from a specified island but Linsley & Usinger (1966) include Charles Island in their distribution.

Bombyliidae: *Anthrax primitiva* Walker (1849: 257) (= *Villa*).

Calliphoridae: *Musca pionia* Walker (1849: 881) (= *Phaenica* s.g. *Viridinsula*); *Musca phauda* Walker (1849: 896) (= *Cochliomyia macellaria* F., the secondary screw-worm fly).

Muscidae: *Anthomyia setia* Walker 1849: 956 (= *Ophyra aenescens* Wiedemann).

In Dublin there are 35 unidentified Diptera from Charles I. representing the following families: Agromyzidae, Anthomyzidae, Asteiidae, Bombyliidae, Ceratopogonidae (*Dasyhelea? paracincta* Wirth, det. R. P. Lane), Dolichopodidae (?*Chrysotus* sp., det. C. E. Dyte), Ephydridae, Otitidae, Syrphidae.

HYMENOPTERA, Braconidae: in Dublin are unidentified specimens of *Apanteles, Chelonus* and *Opius*. No Braconidae are recorded from Galapagos by Linsley & Usinger (1966) or Linsley (1977).

Chalcididae: *Chalcis cabira* Walker (1838: 472), Charles I., omitted by Linsley & Usinger (1966).

Cleonymidae: *Merostenus sadales* Walker (1839: 93, plate P, Walker 1840–1842, see fig. 16 of the present paper), omitted by Linsley & Usinger (1966).

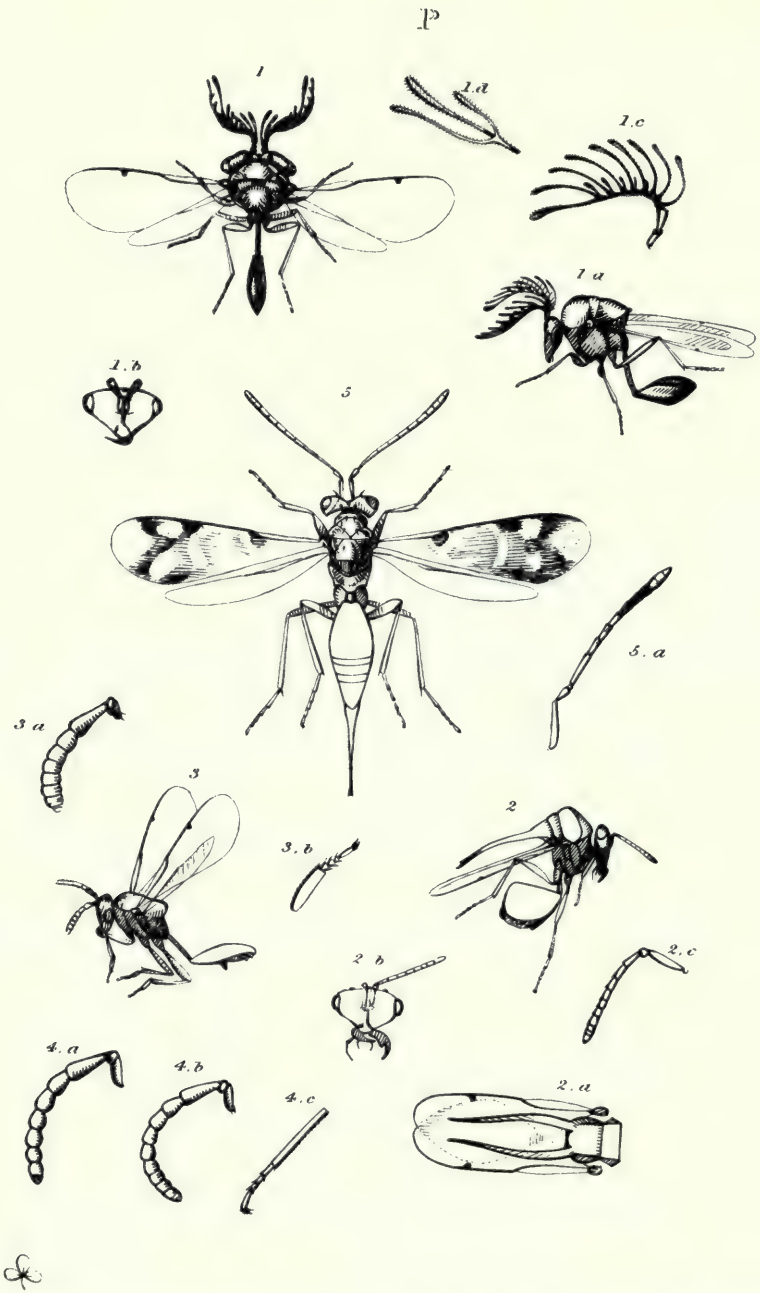

Fig. 16 Chalcidoid Hymenoptera depicted on Plate P in the first volume of the *Entomologist* (see Walker, 1840–42). This illustrated Darwin's *Beagle* captures described by Walker in his *Monographia Chalciditum* (1839): 1, *Eucharis volusus* Walker (see *Insect Notes*, 3561, King George's Sound, Australia); 2, *Thoracantha furcata* Fabricius (see 3858, Bahia, Brazil); 3, *Eucharis iello* Walker (see 3524, Hobart, Tasmania); 4, *Eucharis zalates* Walker (see 3561, King George's Sound, Australia); 5, *Merostenus sadales* Haliday (see 3363, Charles Island, Galapagos). The *Thoracantha* should be compared with the illustration and comments on that genus in Fig. 17.

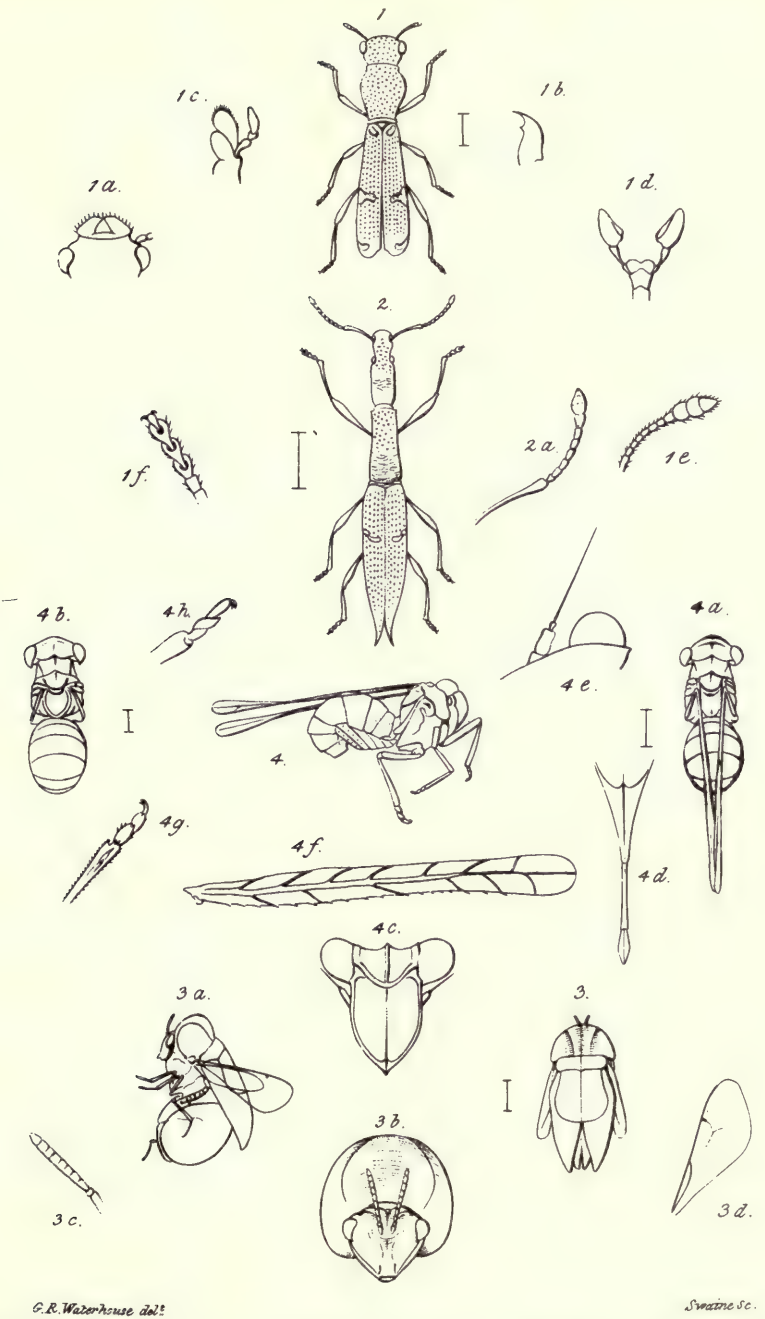

Fig. 17 Insects collected in Australia and Bahia, Brazil and described by G. R. Waterhouse: 1, *Allelidea ctenostonoides* (Coleoptera, Malachiidae, see *Insect Notes*, 3550, King George's Sound); 2, *Leptosomus acuminatus* L. (Coleoptera, Curculionidae, see 3528, Sydney); 3, *Thoracantha latreilli* (Hymenoptera, Eucharitidae, see 3858, Bahia); 4, *Alleloplasis darwinii* (Hemiptera, Derbidae, see 3561, King George's Sound and Eponyms). The *Thoracantha* should be compared with the species depicted in Fig. 16. These chalcid wasps have remarkable projections from the thorax over the abdomen so that from above they bear a strong resemblance to beetles of the genus *Mordella*. (By courtesy of the Royal Entomological Society of London from their *Transactions* for 1839).

Formicidae: *Camponotus planus* Smith (1877: 83); *C. macilentus* Smith (1877: 83), each of these ants have since been divided into several subspecies (mostly by Wheeler, 1919) on the different islands of the Galapagos (Linsley & Usinger, 1966).

Pteromalidae: *Pteromalus eneobulus* Walker (1838: 475), Charles I., omitted by Linsley & Usinger (1966).

Sphecidae: *Nitela darwini* Turner (1916: 345).

Thynnidae: *Agriomyia vagans* Smith (1877: 83).

HEMIPTERA–Heteroptera, Lygaeidae: *Nysius* (?) *marginalis* Dallas (1852: 556). Ashlock (1967: 42) erected the genus *Darwinysius* for this species.

Miridae: *Capsus darwini* Butler (1877: 89), 'a pretty and well-marked species' (= *Dagbertus*); *C. nigritulus* Walker (1873: 112) (= *Polymerus*); *C. quadrinotatus* Walker (1873: 113) 'evidently a common species' (see Fig. 18 of the present paper); *C. spoliatus* Walker (1873: 112) (= *Dagbertus*); *Miris lineata* Butler (1877: 89) (= *Trigonotylus*).

Homoptera, Cicadellidae: *Jassus planus* Butler (1877: 91) (= *Agallia*); *J. striolarius* Butler (1877: 91) (= *Agallia*).

Fulgoridae: *Delphax simulans* Walker (1851*a*: 356) (= *Ilburnia*); *D. substituta* Walker (1851*a*: 354) (= *Delphacodes*); *D. vicaria* Walker (1851*a*: 355) (= *Delphacodes*); *Issus rostrifer* Butler (1877: 90) (= *Galapagosana*); *I. varius* Walker (1851*a*: 355) (= *Philatis*).

Several Hemiptera occur also on James I. (see entries 3365, 3366) (see also entries 3230, 3232).

ORTHOPTERA, Acrididae: *Acridium literosum* Walker and *A. melanocerum* Stål (Walker 1870: 582) may refer here.

3365. 3366. Small insects Do. Do. James Island. [= Santiago]. October.

COLEOPTERA, Carabidae: *Calosoma galapageium* Hope (1838: 130), island unspecified by Hope but see Linsley & Usinger (1966); *Feronia galapagoensis* Waterhouse, G. R. (1845*a*: 21) (= *Pterostichus*); *Notaphus galapagoensis* Waterhouse, G. R. (1845*a*: 23) (= *Bembidion*).

Coccinellidae: *Scymnus galapagoensis* Waterhouse, G. R. (1845*a*: 41).

Chrysomelidae: *Diabrotica limbata* Waterhouse, C. O. (1877: 81) (= *Acylymma*).

Curculionidae: *Anchonus galapagoensis* Waterhouse, G. R. (1845*a*: 39).

Dermestidae: *Dermestes vulpinus* Auct. (Waterhouse, G. R. 1845) (= *D. maculatus* De Geer).

Elateridae: *Physorhinus galapagoensis* Waterhouse, G. R. (1845*a*: 25) (= *Anchastus*) may refer here.

Melyridae: *Ablechrus flavipes* Waterhouse, C. O. (1877: 79, gen. et sp.) (also listed in error by Waterhouse on p. 81 as *A. darwinii*).

Tenebrionidae: *Ammophorus bifoveatus* (Waterhouse, G. R., 1845*a*: 31) (= *A. bifoveatus* subsp. *bifoveatus*), there is another subspecies *barringtoni* Van Dyke on Barrington I. [= Santa Fé]. *Pedonoeces costatus* Waterhouse, G. R. (1845*a*: 35, gen. et sp.). *Stomion helopoides* and *S. laevigatus* Waterhouse, G. R. (1845*a*: 30 gen. et sp.) may refer here.

DIPTERA, Piophilidae: *Piophila atrata* Meigen (Walker, 1849: 1065) (= *P. casei* L.), one in the BM (1845–63), 'Galapagos'; the well known 'cheese skipper' widely dispersed by commerce. This family is not recorded from Galapagos by Linsley & Usinger (1966) or Linsley (1977).

Sarcophagidae: *Sarcophaga inoa* Walker (1849: 832), 'Galapagos' is included here as Linsley & Usinger (1966) include Santiago though Lopes (1878) does not (= *Galapagomyia*). *S. violenta* Walker (1849: 826), 'Galapagos' is recorded from James I. by Lopes (1978) (= *Gigantotheca*).

Tephritidae: *Trypeta* (now *Euaresta*) *aesia* Walker (1849: 1006) 'St James's Isle, Galapagos' has not been reported since (Foote 1982), one specimen in the BM (1845–63), James Island numbered 3365.

HYMENOPTERA, Cleonymidae: *Lelaps sadates* Haliday (Walker, 1839: 93).

Eulophidae: *Cirrospilus buselus* Walker (1839: 96).

Pteromalidae: *Spalangia endius* Walker (1839: 96) (= *S. nigra* Latreille).

All of these Chalcidoid Hymenoptera are omitted by Linsley & Usinger (1966).

LEPIDOPTERA, Arctiidae: *Deiopeia ornatrix* L. var. (= *Utetheisa*) (Butler, 1877), 'Albemarle' is included here as there is no provision in Darwin's *Notes* for it. Linsley & Usinger (1966) record it from Isabella [= Albemarle] and Baltra [= South Seymour].

HEMIPTERA–Heteroptera, Coreidae: *Stenocephalus insularis* Dallas (1852: 482) (= *Dicranocephalus*).

Lygaeidae: *Nysius marginalis* Dallas (1852: 556) (= *Darwinysius* Ashlock, 1967).

Miridae: *Capsus quadrinotatus* Walker (1873: 113) (= *Dagbertus*); *C. spoliatus* Walker (1873: 112) (= *Dagbertus*).

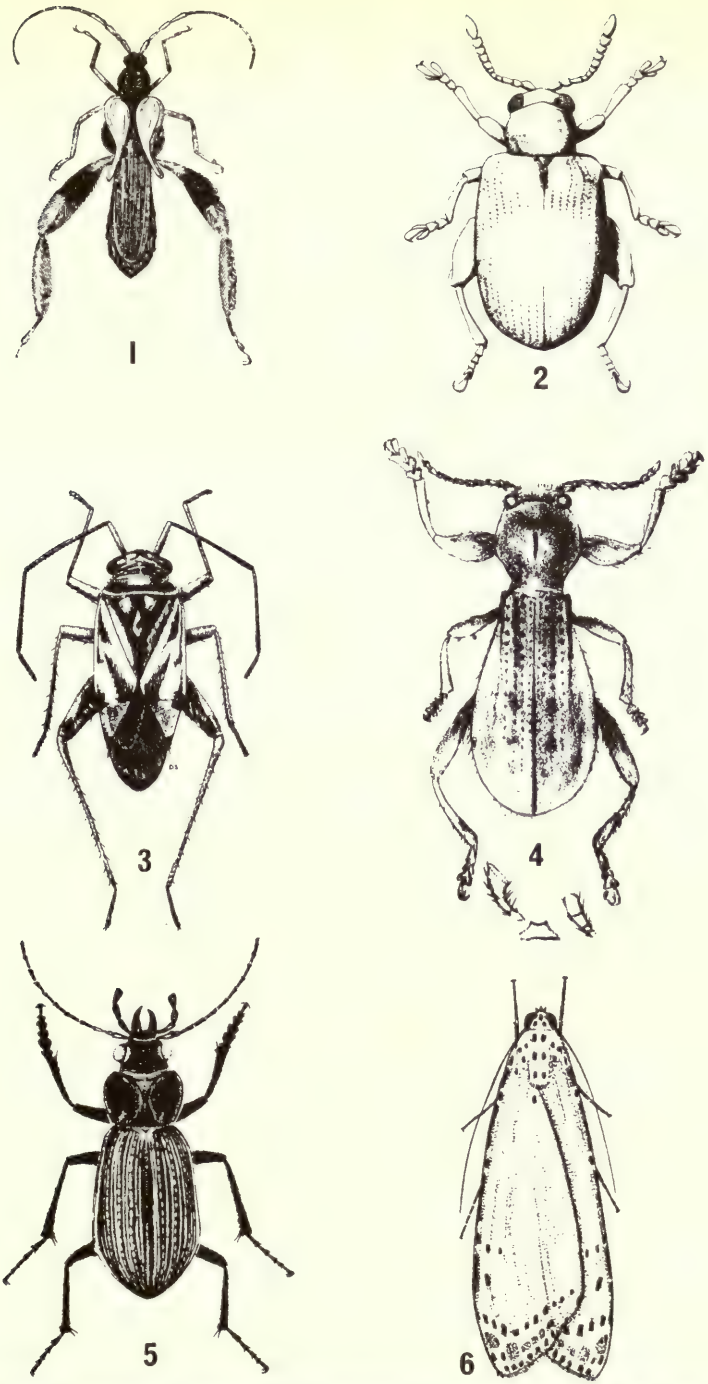

Fig. 18 1, *Callisphyris macropus* Newman (Coleoptera, Cerambycidae, Chiloe, see 2367) (from the *Entomologist,* 1841); 2, *Distigmoptera darwini* Scherer (Coleoptera, Chrysomelidae, Halticinae, Maldonado, see 1310) (by courtesy of the Museum G. Frey); 3, *Capsus quadrinotatus* (Walker) (Hemiptera, Miridae, Galapagos, see 3363) (by courtesy of the California Academy of Sciences); 4, *Cormodes darwini* Pascoe (Coleoptera, Cleridae, Lord Howe's Island) 'An insect so suggestive of Mr Darwin's theory should appropriately bear his name' (see Eponyms) (from the *Journal of Entomology*, 1862); 5, *Calosoma galapageium* Hope (Coleoptera, Carabidae, Galapagos Islands, see 3366); 6, *Utetheisa ornatrix* L. (Lepidoptera, Arctiidae, Galapagos Islands, see 3365). Last two from Hickin (1979).

Tingidae: *Monanthia cytharina* Butler (1877: 90) (= *Corythaica*).

Homoptera, Cicadellidae: *Acocephalus obliquus* Walker (1851*b*: 851) (= *Mesamia*). *Jassus lucidus* Butler (1877: 91) (= *Baclutha*).

Fulgoridae: *Delphax simulans* Walker (1851*a*: 356) (= *Ilburnia*); *D. substituta* Walker (1851*a*: 354) (= *Delphacodes*); *D. vicaria* Walker (1851*a*: 355) (= *Delphacodes*), *Delphax* larva and pupa ab. (Walker, 1851*a*: 356); *Issus varius* Walker (1851*a*: 355) (= *Philatis*).

Several Hemiptera are common to Charles I. (see entries 3363, 3364). See also entries 3230, 3232.

3390. Small insects, sweeping. November. Tahiti.

No specimens found.

3393. 3394. Insects. Do. Do.

No specimens found.

3415. 3416. 3417. 3418. Insects sweeping; Bay of Islands, New Zealand. December.

COLEOPTERA, Cerambycidae: *Oemona humilis* Newman (1840: 8, gen. et sp. in 'Cabinet of the Entomological Society'); *Xylotoles lentus* Newman (1840: 12, gen. et sp. in 'Cabinet of the Entomological Society').

Chrysomelidae, Alticinae: An unidentified specimen in the BM (1887–42) Accessions, New Zealand.

Coccinellidae: *Coccinella leonina* F., one in the BM, and some unidentified specimens in accessions (1887–41).

Curculionidae: *Cyttalia griseipila* Pascoe (Lea, 1926) probably refers here.

Lathridiidae: one in the BM (1887–42 accessions, numbered 3415.

DIPTERA. There are twelve unidentified specimens in Dublin, of the families Agromyzidae, Chloropidae and Syrphidae.

HEMIPTERA: Cixiidae: *Oliarus oppositus* (Walker) in the BM (1885–119) are two numbered 3415 and two numbered 3418 (det. C. Butcher). Some unidentified Miridae and Pentatomidae (unnumbered) are present in BM accessions.

HYMENOPTERA, Pteromalidae: *Pteromalus lelex* Walker (1839: 95).

3420. Cicindela in extraordinary numbers, in all parts of the country. Do. Do.

COLEOPTERA, Carabidae: *Cicindela,* No specimen found.

1835 *Decr* *Insects* *23.*

[Some pages are crossed out here, by Darwin?, as they were thought to have been repeated; however, only parts of pages were repeated and entries 3421–3528 were not. The double entries are not included here]

3421. 3422. Insects inhabiting rotten wood. N. Zealand.

No specimens found.

3423. Bug. caught at Iquique, Peru. Is called in the Mendoza country, Benchuca; is mentioned by many travellers, as so great a pest and bloodsucker; inhabits crevices in old walls. This specimen when caught was very thin; even when showing it a finger, would, when placed on a table immediately run at it with protruded sucker. Being allowed, sucked for 10 minutes **caused very little pain** [inserted by Darwin]; became bloated and globular & 5 or 6 times the original size; 18 days afterwards was again ready to suck; being kept 4 and $\frac{1}{2}$ months became of proper proportions, as thin as at first; I then killed it. A most bold and fearless insect.

HEMIPTERA–Heteroptera, Reduviidae (Triatominae): no specimen found, but from Peru this would be *Triatoma infestans* Klug. This bug is one of the vectors of American trypanosomiasis or Chagas' disease (after its discoverer, Carlos Chagas).

Adler (1959) first suggested that Darwin may have contracted Chagas's disease during his sojourn in Mendoza and that his persistent ill-health in later life could be attributed to this disease, though it was not clinically recognized until 1909. This was contested by a number of authors including Woodruff (1965) and others (Winslow, 1971), largely on the grounds that victims usually presented

with cardiac symptoms and did not survive to Darwin's age. Lewinsohn (1979) has recently reviewed the history of the disease and draws attention to the important rediscovery of Chagas' first patient, still alive and well in 1979 (aged 72). This patient presented with similar symptoms to Darwin and led Lewinsohn to suggest that 'Berenice is (and Darwin perhaps was) a carrier of the infection rather than the disease'.

To become infected a patient must not only be bitten by the bug but, since the infective stage of the causative protozoan (*Trypanosoma cruzi*) resides in the gut, the wound must be contaminated by its faeces. Almost invariably the bug defecates while sucking blood on the skin of its victim.

Darwin (1845: 330) records in the *Journal* observations similar to the entry in the *Insect Notes* above, but his additional comment shows that while the bug was indebted to one of the officers for the meal described above, it nevertheless establishes that Darwin too had been exposed to them on another occasion. Writing of a night spent in the village of Luxan [Argentina] he says 'At night I experienced an attack (for it deserves no less a name) of the Benchuca, a species of Reduvius, the great black bug of the Pampas. It is most disgusting to feel soft wingless insects, about an inch long, crawling over one's body. Before sucking they are quite thin but afterwards they become round and bloated with blood, and in this state are easily crushed'.

Entry 2913 also shows that on yet another occasion, this time at Copiapo in Chile, he was exposed to the attacks of the Benchuca. The chances of his contracting Chagas' disease do therefore seem rather high. In all of these localities the bug concerned would have been *Triatoma infestans* and not *Panstrongylus* (= *Conorrhinus*) *megistus* (Burmeister) as suggested by Poulton (1904) when comparing W. J. Burchell's and Darwin's experiences with these bugs. Burchell's specimens were collected in Brazil where *P. megistus* is the principal bug biting man and thus the vector of Chagas' disease. There is no evidence that Burchell suffered the symptoms of Chagas' disease. Little is known of his later life but he died at the age of 80, by his own hand (Poulton 1905).

3445. Staphylinus; Carrion. Hobart Town. Van Dieman's Land [Tasmania]. Feby.

COLEOPTERA, Staphylinidae: no specimen found, but my colleague P. M. Hammond suggests that this might be *Creophilus erythrocephalus* F., a common carrion species frequently collected by early travellers in Tasmania. See also entry 708.

3446. Aphodius, Cows dung. Do.

COLEOPTERA, Scarabaeidae: no specimens found. See entry 3506.

3504. Aphodius, Horses, dung. Do.

COLEOPTERA, Scarabaeidae: no specimen found. See entry 3506.

3505. Aphodius. Cows, dung. Do.

COLEOPTERA, Scarabaeidae: no specimen found. See entry 3506.

3506. 3507. 3508. 3509. 3510. 3511. 3512. I believe includes 3 species of Onthophagus; 2 latter common in cows dung:—from Do.

COLEOPTERA, Scarabaeidae: no specimens found.

In the *Journal* Darwin (1845: 490, footnote), in a discussion on dung beetles seen on the voyage, says 'In Van Dieman's Land, however, I found four species of Onthophagus, two of Aphodius, and one of a third genus, very abundant under the dung of cows; yet these latter animals had been then introduced only thirty-three years. Previously to that time, the Kangaroo and some other small animals were the only quadrupeds; and their dung is of a very different quality from that of their successors introduced by man'. (See also entries 1491, 2102, 3506, 3819). Bornemissza (1983) suggests that: Darwin's four *Onthophagus* species were probably *auritus* Erichson, *fuliginosus* Erichson, *mutatus* Harold and *posticus* Erichson, all then undescribed; one of his *Aphodius* species was *pseudotasmaniae* Given; his third genus was probably *Proctammodes* (= *Proctophanes*) *sculptus* Hope. He also verifies the accuracy of Darwin's observations. No specimens have been found.

3513. Phalacrus, in rotten wood; has a **Phalacrus** been taken **before** out of Europe? Do.

COLEOPTERA, Phalacridae: *Litochrus sydneyensis* Blackburn, 'King George's Sound'; *Phalacrus corruscans*, Panzer, 'King George's Sound'.

These are the only Australian Phalacridae collected by Darwin, both recorded by Lea (1926: 281). Although the entry here apparently alludes to Hobart Town from the 'Do' I refer them here because

of Darwin's special comment. The entries in the *Notes* are clearly out of sequence anyway as the *Beagle* visited Sydney, Tasmania, King George's Sound, in that order. In fact Phalacridae had previously been collected during the voyage in Maldonado (entries 1310, 1321–2) and Galapagos (3363–4).

3514. Larva. beneath stones, fresh water. Do.

Order (?), no specimen found.

3524. 3525. 3526. Insects by sweeping. Do.

In the following list of Coleoptera BM data are only cited where new records or misidentifications of Darwin material are involved. All are from Lea (1926) unless otherwise indicated (Lea's new species have the reference and pagination).

COLEOPTERA, Anthribidae: *Araeocerus lindensis* Blackburn; *Xynotropis micans* Blackburn.

Carabidae: *Bradycellus promtus* Erichson.

Chrysomelidae: *Ditropidus minutus* Lea; *Haltica variegata* Waterhouse, G. R. (1838: 133); *Idiocephala darwini*; *I. semibrunnea*; *I. tasmanica* Saunders (1843: 317) (all 'In Cabinet of Entomological Society'); *Monolepta ordinaria* Blackburn; *M. nigricornis* Blackburn; *Rhyparida commutabilis* Lea.

Coccinellidae: *Diomus pumilio* Weise, one in the BM; *Rhizobius alphabeticus* Lea; *R. pulcher* Blackburn; *Scymnus maestus* Lea (1926: 287); *S. vagans* Blackburn.

Curculionidae: *Elleschodes tenuistriatus* Lea; *Encosmia ventralis* Lea (1926: 282); *Epamaebus ziczac* Lea; *Epamaebus* sp., one unidentified in the BM (1885–119), numbered 3524; *Eristus blackburni* Lea, one in the BM (1885–119), numbered 3524, but not included in Lea (1926); *Misophrice submetallica* Blackburn, one in the BM (1887–42), not in Lea (1926); *Rhamphus acaciae* Lea; *R. setistriatus* Lea (1926: 285); *Storeus brachyderes* Lea; *S. metasternalis* Lea (1926: 283); *Symbothinus squalidus* Blackburn (det. Lea), one in the BM (1887–42), not in Lea (1926); *Thecia pygmaea* Pascoe, one in the BM (1885–119), my colleague R. T. Thompson informs me that this species was wrongly identified by Lea. *Tychius minutissimus* Boh.

Dermestidae: *Anthrenus ocellifer* Blackburn.

Hydrophilidae: *Octhebius macrognathus* Lea (1926: 279).

Malacodermidae: *Hypattalus abdominalis* Erichson.

Mordellidae: One unidentified specimen in the BM Accessions.

Ptinidae: *Dryophilodes angustus* Lea (1926: 282); *D. squalidus* Lea (1926: 282).

Scaphidiidae: *Scaphisoma instabile* Lea (1926: 280).

DIPTERA, Asilidae: *Bathypogon* sp. (det. G. Daniels), Tasmania. One in the Bigot collection at Oxford.

There are about 40 mostly unidentified Diptera in Dublin representing the following families: Chamaemyiidae (*Pseudoleucopis ?fasciventris* Malloch), Chironomidae *Chironomus* sp., det. P. S. Cranston), Chloropidae, Dolichopodidae, Empididae (*Hilarempis* sp., det. K. G. V. Smith), Phoridae, Muscidae (including *Coenosia acuticornis* Stein, det. A. C. Pont), Sciaridae and other small Nematocera and Acalyptratae.

HEMIPTERA–Heteroptera. In Oxford are a few specimens as follows: Pentatomidae (genus near *Nezara, Dinocoris* sp.), Coreidae (*Amorbus* sp.), Homoptera, Psyllidae. *Acizzia*. Three specimens of probably the same species in the BM (1885–119), Hobart Town and numbered 3524 and 3526 and another damaged Psyllid numbered 3524 (see also entry 3561).

Spodyliaspidae: three in the BM Accessions (1885–119), Hobart Town, numbered 3524 and 3526 (one a *Glycaspis* sp. det. D. Hollis).

These Homoptera were probably swept from *Acacia* and *Eucalyptus*. In Oxford there are some unidentified specimens of Homoptera.

HYMENOPTERA: The following Chalcidoidea were described or identified in Walker (1838, 1839, 1840–1842) and are grouped in families assuming Walker's generic placements were correct.

Chalcididae: *Hockeria eracon, H. proxenus, Smiera teleute.*

Encyrtidae: *Encyrtus arsanes, E. cheles, E. lucetius, E. odacon, E. salacon, E. xuthus, E. zebina.*

Eucharitidae: *Eucharis eribotes, E. iello* (illustrated in *Entomologist* plate P, fig. 3, see Walker. 1840–1842)—see Fig. 16 of the present paper).

Eulophidae; *Elachestus artoeus, Entedon hestia, Eulophus itea, Euplectrus bicolor* Swederus, *Ophelimus sabella, O. ursidus* Haliday, *Tetrastichus arses, T. autonae, T. dymas, T. fannius, T. glycon, T. hippasus, T. neis, T. proto, T. valens, T. xenares, T. zaleucus.*

Eurytomidae: *Eurytoma eleuthor, E. pidytes, E. volux, Isosoma ravola.*

Lamprotatidae: *Lamprotatus bato, L. ciron, L. hecatoeus, L. thera, Seladerma cernus, S. letus, Semiotus merula.*

Pteromalidae: *Pteromalus baton, P. niphe, P. oceia, P. thestor, P. unca.*

Torymidae: *Megastigmus borus, M. drances, M. laminus.*

Halictidae: *Halictus repertus* Cockerell (1932: 520) in Oxford, refers here.

NEUROPTERA, Mantispidae: one unidentified specimen in Oxford.

ORTHOPTERA, Acrididae: one unidentified in Oxford.

3527. Do. Alpine; **Insects** Mount Wellington, elevation 3100 feet. [Tasmania].

COLEOPTERA, Coccinellidae: *Scymnus flavolaterus* Lea (1926: 287).

HYMENOPTERA, Pteromalidae: *Micromelus silanus* Walker (1843*e*: 46).

In Dublin there are about 40 unidentified Diptera and Hymenoptera standing over the number 3527. The Diptera include the families Agromyzidae, Dolichopodidae, Empididae, Ephydridae (*Hydriellia* and *Notiphila*, det. B. H. Cogan), Lauxaniidae, Phoridae, Stratiomyiidae (*Actina* sp., det. J. Chainey), Tipulidae.

3528. Insects sweeping near Sydney, S. Covington.

COLEOPTERA, Buprestidae: *Cisseis puella* Kerr, *Germarica lilliputana* Thomson.

Chrysomelidae: *Coenobius spissus* Lea, *Ditropidus inconspicuus* Lea, *D. lentulus* Charpentier, *D. striatopunctatus* Lea.

The following list of Coleoptera are all recorded in Lea (1926), unless other references are cited.

Chrysomelidae (continued): *Haltica aenea, H. bicolor, H. crassicornis, H. labialis, H. scutellata* (all Waterhouse, G. R. 1838), *Monolepta subsuturalis* Blackburn, *M. sordidula* Blackburn.

Coccinellidae: *Novius bellus* Blackburn, *N. sanguinolentus* Mulsant, *Rhizobius debilis* Blackburn, *R. ventralis* Erichson, *Scymnus elutus* Lea, *S. notescens* Blackburn, *Serangium mysticum* Blackburn, *S. obscuripes* Lea. In the BM are also the following Darwin Coccinellidae from Sydney but, unrecorded by Lea: *Coelophora inequalis* (F.), *Diomus notescens* Blackburn, *D. pumilio* Weise, *Harmonia conformis* (Boisduval), *Rhizobius forestieri* (Mulsant) and two unidentified specimens in the Accessions.

Curculionidae: *Cydmaea cara* Lea, *C. pusilla* Pascoe, *Desiantha malevolens* Lea, *Empolis leai* Blackburn, *Leptosomus acuminatus* L., (Waterhouse, G. R., 1839) (= *Rhadinosomus*), see Fig. 17.

Hydrophilidae: *Paracymus lindi* Blackburn; *Paranacaena* sp. near *horni* Blackburn, one in Cambridge with a label suggesting that it is Australian, as are other members of the genus.

Lathridiidae: *Croticaria australis* Blackburn.

Malacodermidae: *Laius cinctus* Redtenbacher.

Scarabaeidae: *Automolus humilis* Blanchard.

DIPTERA. In Dublin there are about 70 specimens, mostly unidentified, as follows: Chironomidae (*Chironomus* sp., det. P. S. Cranston), Dolichopodidae, Empididae (*Hybos* sp., det. K. G. V. Smith), Micropezidae (*Taeniaptera lasciva* F., *Cardiocephalus triluminata* Cresson, det. B. H. Cogan), Muscidae (*Atherigona tibiseta* Malloch, *Coenosia acuticornis* Stein, det. A. C. Pont), Sciaridae, Sepsidae (*Xenosepsis sydneyensis* Malloch, *Parapalaeosepsis plebeia* Meijere, det. A. C. Pont), Stratiomyidae and other small Nematocera and Acalyptrates in poor condition.

HEMIPTERA–Heteroptera. At Oxford there are specimens of Pentatomidae (*Canthecona, Dinocoris, Elasmostethus* and a genus near *Nezara*); Lygaeidae (*Graptostethus* sp.); Reduviidae (immature); Corixidae (two *Sigara australis* (Fieber) 'sent to G. W. Kirkaldy'). Lygaeidae: *Ontiscus darwini* Hamid (1975: 42), two in BM (1885–119) numbered 3528, see also 3561.

Homoptera. *Cephalelus brunneus* (Waterhouse, G. R., 1839: 195). In the BM there are unidentified Cicadellidae (1) and Fulgoroidea (1) numbered 3528. At Oxford there are a few specimens of Cicadidae (*Melampsalta*), Flatidae (*Carthaea*), Cercopidae (*Orthoraphia*) and some unidentified genera.

HYMENOPTERA, Gasteruptiidae (= Evaniidae): *Foenus darwinii* Westwood (1841: 537; 1844: 259) (= *Hyptiogaster*). In the 1844 version of this paper under *Monomachus falcator* Klug ms Westwood says 'Obs. C. Darwin, Esq. brought home a species of this genus which has for some time been in the hands of W. E. Shuckard, Esq., for description.

Halictidae: *Halictus (Evylaeus) darwiniellus* Cockerell (1932: 519). Cockerell comments on another Australian bee (*Reepenia testacea* Smith) possibly from the *Beagle* expedition via J. G.

Children's collection but the provenance is uncertain. Both bees are in Oxford and are the only Darwin bees so far located.

Chalcidoidea: Francis Walker (1838, 1839) described the following species from Sydney. These are placed in families assuming the generic placement to be correct, which knowing Walker's reputation may not be the case (see Notes to this paper).

Chalcididae: *Chalcis phya, Hockeria nyssa, H. proxenus.*

Encyrtidae: *Encyrtus pacorus.*

Eucharitidae: *Eucharis eribotes, E. theocles, E. valgius, E. xeniades, E. zalates.*

Eulophidae: *Entedon diocles.*

Eupelmidae: *Eupelmus eurozonus* Dalman.

Eurytomidae: *Eurytoma olbus, E. tellis, E. volux. Palmon olenus.*

Lamprotatidae: *Gastrancistrus menoetes. Lamprotatus damia, L. mycon, L. nicon. Seladerma athanis.*

Torymidae: *Callimome vibidia.*

In Dublin there are about 25 Hymenoptera from Sydney, mostly Braconinae, Opiinae and *Apanteles* (det. T. Huddleston). In Oxford there is one unidentified Chalcidid.

ORTHOPTERA, Acrididae: there are seven unidentified specimens in Oxford

Tettigonidae: there are two unidentified specimens in Oxford plus 14 other Orthoptera.

1836 *Insects* *24.*

[Entries 3390–3527 repeated and crossed out]

1836 *Insects* *25.*

3550. Beetle, inhabiting in numbers a large flower [Hobart town Feby—crossed out] King George's Sound [Australia] March.

COLEOPTERA, Malachiidae: *Allelidea ctenostomoides* (Waterhouse, G. R., 1839: 194). Six in the BM (1841–32). See Fig. 17.

3556. Curculio, one of the most abundant insects here [Hobart Town Feby—crossed out] King George's Sound March.

COLEOPTERA, Curculionidae: *Belus testaceus* Waterhouse (1839: 188).

Probably refers here as it appears to have been singled out for description by Waterhouse; all other weevils are included in the next entry.

3561. Small insects sweeping on coarse grass or brush wood. King George's Sound. March.

COLEOPTERA: In the following list all are recorded in Lea (1926) unless otherwise indicated (date and page given for Lea if his new species).

Clambidae: *Clambus australiae* Lea (1926: 280).

Chrysomelidae: *Haltica acuminata, H. aeneo-nigra, H. bivittata, H. nitida, H. ochracea, H. ovata, H. picea, H. pygmaea, H. subaena, H. substriata* (all described by G. R. Waterhouse, 1838). *Ditropidus jacobyi* Baly.

Coccinellidae: *Rhizobius occidentalis* Blackburn, *R. subhirtellus* Lea (1926: 286), *Scymnus flavifrons* Blackburn.

Curculionidae: *Antyllis latipennis* Lea. One in the BM (1885–119) labelled Swan River, W. Australia (? non-Darwin) is referred here (Lea, 1926: 284). *Calandra oryzae* L. *Cydmaea diversa* Blackburn. *Decilaus moluris* Lea. *Ethadomorpha clauda* Blackburn. *Microberosiris exilis* Lea. *Olanea* sp. *Orichora trivirgata* Pascoe. *Rhamphus perpusillus* Pascoe. *Storeus variabilis* Lea. *Thechia brevirostris* Lea (1926: 284). *T. longirostris* Lea (1926: 285).

Dascillidae: *Cyphon fenestratus* Blackburn.

Dytiscidae: *Hydroporus darwinii* Babington (1842: 13) (= *Necterosoma*); *H. unidecemlineatus* Babington, two in the BM (1863–44) are labelled Tierra del Fuego apparently in error as this species is referable to *Necterosoma*, a genus which does not occur in South America (Watts, 1978: 95).

Tenebrionidae: *Hypaulax ampliata* Bates, F. var. *parryi* Bates, F. (1874:20), two in the BM (1881–19, F. Bates acc. No.). 'Voyage of the Beagle' on blue paper. I refer these here although they are large beetles. The typical form came from Nicol Bay, Western Australia. Bates described the

two specimens of the var. on the same page and noted that they were ex coll. [F.J.S.] Parry, but the precise locality is unknown.

DIPTERA, Acroceridae: *Ogcodes darwini* Westwood (1876: 516) in Oxford may refer here.

In Dublin there are about 20 Diptera in poor condition including several Dolichopodidae.

HEMIPTERA–Heteroptera, Lygaeidae: *Ontiscus darwini* Hamid (1975: 42), two in BM (1885–119), see also 3528.

Pentatomidae: Genus near *Nezara*, one in Oxford.

Homoptera, Cicadellidae: *Cephalelus marginatus* (Waterhouse, G. R., 1839: 195, var. β, var. γ).

Delphacidae: *Haplodelphax darwini* Fennah (1965: 33), one in BM (1885–119).

Derbidae: *Alleloplasis darwinii* Waterhouse, G. R. (1839:194). See eponyms for dedication. See Fig. 17.

Eurymelidae: *Anipo darwini* Evans (1942: 144), one in BM (1885–119).

Psyllidae: *Acizzia* sp., one in the BM (1885–119), a different species from 3524–5.

HYMENOPTERA: Walker (1838, 1839) described the following Chalcidoidea. See comments under previous entries 3528.

Chalcididae: *Hockeria dexius*.

Encyrtidae: *Encyrtus lucetius, E. xuthus, E. zameis. Ericydnus chryscus*.

Eucharitidae: *Eucharis volusus* (Plate P) (see Fig. 16, present paper), *E. zalates* (Plate P, Walker 1840–1842) (see Fig. 16, present paper).

Eulophidae: *Euderus mestor, Eulophus megalarus. Tetrastichus lelaps*.

Eupelmidae: *Eupelmus dodone*.

Eurytomidae: *Eurytoma aretheas, E. pidytes. Isosoma oritias*.

Lamprotatidae: *Lamprotatus nelo, Seladerma athanis, Semiotus dice, S. theope*.

Perilampidae: *Perilampis saleius*.

Pteromalidae: *Pteromalus fabia*.

Torymidae: *Callimome daonus, C. osinus*.

3588. Beetle taken on board the *Beagle*, Keeling Ids.

COLEOPTERA: no specimen found.

3593. Insects sweeping: the small ant swarms in countless numbers Keeling Isd.

In the *Journal* Darwin (1845, 456, footnote) says of the Keeling fauna 'of insects I took pains to collect every kind. Exclusive of spiders, which were numerous, there were thirteen species[1]. Of these one only was a beetle. A small ant swarmed by thousands under the loose dry blocks of coral, and was the only true insect which was abundant.' The superscript refers to a more informative footnote: 'The thirteen species belong to the following orders:— In the *Coleoptera* a minute Elater; *Orthoptera*, a Gryllus and a Blatta; *Hemiptera*, one species; *Homoptera*, two; *Neuroptera*, a Chrysopa; *Hymenoptera*, two ants; *Lepidoptera nocturna*, a Diopaea, and a Pterophorus (?); *Diptera*, two species.'

No specimens have been found. The *Deiopeia* was listed by Walker (1854: 567) as *D. pulchella* L., but Jordan (1939: 283) described this as subspecies *darwini* of *Utetheisa pulchelloides* Hampson (Arctiidae) and records two males coll. C. Darwin plus other specimens. See entry 3594 for the *Chrysopa*.

3594. Hemerobius.—(last three in April) Do. [Keeling].

NEUROPTERA, Chrysopidae: this is undoubtedly the *Chrysopa* referred to in the *Journal* (Darwin, 1845: 456, footnote) (see entry 3593). There are two specimens in the BM (1885–119), Keeling Isld, one numbered 594 [= 3594], the other bearing a label 'seems to be *Chrysopa innotata*' but they are in fact *C. ramburi* Schneider (det. P. C. Barnard).

3635. Water beetles, mountain stream Mauritius. May.

COLOEPTERA, Hydrophilidae: *Limnoxenus* sp., one in Cambridge labelled 'South America' may refer here. Other specimens (non-Darwin) in the BM are from Europe, Ghana, S. Africa, Sandwich Is. and Australia.

HEMIPTERA–Homoptera, Cicadidae: *Stagira darwini* Distant (1905: 213), one in the BM (1885–119), Mauritius, is referred here as there is no other entry.

3688. 3689. 3690. 3691. Small insects sweeping in valleys of mountains near Simons Bay. [Cape] June.

COLEOPTERA, Anthicidae: *Anthicus (Aulacoderus) atronitidus* Laferté, two in the BM (1885–119, 1887–42), numbered 3689 and 3691 (det. J. C. van Hille).

Chrysomelidae: *Aphthona bevinsi* Bryant (1942: 106), one in the BM numbered 3691.

A. capensis Bryant (1942: 106) may also refer here.

Curculionidae. *Oosomus hariolus* (Dollman in Schoenherr), one in the BM (1875: 36), Cape of Good Hope, numbered 3689 and labelled 'examined by Lacordaire' by Waterhouse and marked with a double asterisk on a separate label. Another Cape specimen is also present in the BM (1887–42) but represents a different species.

Dytiscidae: *Darwinhydrus solidus* Sharp (1882: 374, gen. et sp.), one in the BM (1885–119) numbered 3688.

Hydrophilidae: *Prosthetops capensis* Waterhouse, F. H. (1879: 533, gen. et sp.).

Nitidulidae: *Meligethes splendidulus* Reitter (det. A. M. Easton), two in the BM, one (1885–119) numbered 3691 and the other (1887–42) numbered 3690. *M. viridulus* Reitter (det. Kirejtshuk), four in the BM (1885–119).

DIPTERA, Tachinidae: *Leskia darwini* Emden (1960: 391). One in the BM (1885–119), Cape.

HEMIPTERA–Heteroptera, Lygaeidae: *Ischnodemus darwini* Slater (1964: 116), one in the BM (1885–119).

Homoptera, Cicadellidae: *Caffrolix cyclopia* (Cogan) (Theron, 1983: 150). *Kaapia darwini* Theron (1983: 147, 148), one in the BM (1885–119), numbered 3690.

Dictyopharidae: *Risius darwini* Fennah (1962: 233), one in the BM (1885–119) numbered 3689.

Tropiduchidae: *Stenoconchyoptera darwini* Muir (1931: 308, gen. et sp.), one in the BM numbered 3690.

3692. Acarus, from the common land tortoise of the Cape.—June.

Arachnida, Acari—not an insect.

3693. 3694. 3695. 3696. 3697. 3698. Small Aphodii very numerous beneath dung Do.-June.

COLEOPTERA, Scarabaeidae: no specimens found.

St Helena. July.

3730. Small insects, sweeping high central land.

COLEOPTERA, Carabidae: *Calosoma helenae* Hope (1838: 130), one in the BM (1863–44) (= *Campalita chlorostictum* Dejean spp. *helenae*), see Wollaston, 1877, Basilewsky, 1972.

Elateridae: *Anchastus atlanticus* Candéz. Three in BM (1871.2, Coleoptera accession no.) 'St Helena', with small blue paper triangle.

Scydmaenidae: *Anthicus wollastoni* (Waterhouse, F. H., 1879: 532), Champion (1895: 75) established that this is not an Anthicid but a Scydmaenid, one in the BM (1879–34) (= *Euconnus*).

Four previously described Wollaston (1877) species of Coleoptera were also represented among Darwin's material (see Waterhouse, F. H., 1879) in the BM. These have only handwritten rectangular labels 'St Helena' with 3730 written on the verso and Coleoptera accession number 1879: 35 (error for 34):

Anthribidae: *Homoeodera pygmaea, Notioxenus ferrugineus.*

Cryptophagidae: *Cryptophagus gracilipes* (not found)

Staphylinidae: *Oxytelus alutaceifrons.*

The Coleoptera of St Helena have been recently assessed (Basilewsky, 1972).

DIPTERA, Scathophagidae: *Scathophaga stercoraria* L., one in BM (1885–119) St Helena.

The following St Helena Diptera are in Dublin:

Chironomidae: *Chironomus* sp. (det. P. S. Cranston).

Chloropidae: *Elachiptera lyrica* Sabrosky (det. B. H. Cogan).

Mycetophilidae: *Leia* sp. (det. A. M. Hutson).

Sphaeroceridae: *Leptocera* sp. (det. B. H. Cogan).

HYMENOPTERA, Eulophidae: *Cirrospilus nirreus* Walker (1839: 98).

Pteromalidae: *Pteromalus ipsea* Walker (1839: 97).

There are 20 specimens of unidentified Hymenoptera in Dublin as follows:

Braconidae (*Aphidius* spp.), Ichneumonidae (Campopleginae) (det. T. Huddleston).
The Diptera and Hymenoptera of St Helena are assessed in Basilewsky (1977).

3819. 3820. Very common beetle beneath dung on higher parts of St Helena. This is the most extraordinary instance yet met with by me of transported, or change of habits of stercovorous insects.

COLEOPTERA, Scarabaeidae: no specimen found, but see entries 3821, 3822.

In the *Journal* (Darwin, 1845, 490, footnote) in a lengthy footnote on dung beetles says of the St Helena insects:— 'Among these insects, I was surprised to find a small Aphodius (nov. spec.) and an Oryctes both numerous under dung. When the island was discovered it certainly possessed no quadruped, excepting *perhaps* a *mouse*: it becomes therefore, a difficult point to ascertain, whether these stercovorous insects have since been imported by accident, or if aborigines, on what food they formerly subsisted.' (See also entries 1491, 2102, 3506, 3821, 3822 for other parts of this discussion).

In the *Ornithological Notes* Barlow (1963: 211) cites Darwin's use of the word 'Krotophagous' and says 'Not in *O.E.D.* In the small pocketbooks Darwin carried with him on expeditions inland, he coins the word "omni-stercivorous" for dung-eating Coleoptera; date, 4th September 1833.'

3821. 3822. Aphodius higher part of St Helena.

COLEOPTERA, Scarabaeidae: no specimens found but this and the previous entry could refer to *Aphodius (Nialus) pseudolividus* Balthasar or *A. granarius* (L.). Both species occur on St Helena (Wollaston 1877, Decelle 1972).

3823. 3824. 3825. 3826. 3827. 3828. 3829. Flys [*sic*] and other insects taken on the mountainous parts and far from houses in Ascension. July.

Duffy (1964) provides a faunal list of Ascension but even by using this no Darwin material has been found. See also entries 3865–3867.

3858. 3859. 3860. Small insects sweeping in forest and open places. These insects products of two whole days sweeping.—After winters rainy season. Beginning of August. Bahia. Brazil. August.

COLEOPTERA, Bruchidae: *Bruchus* with an apparently unpublished Pic name, two in the BM (1885–119, 1887–42), one numbered 3860. *Bruchus* sp., one in the BM (1858–60).

Chrysomelidae: *Syphrea bahiensis* Bryant (1942: 107) may refer here (or 325). See also 618.

Curculionidae: Baridinae, three in the BM (1887–42) plus one *Geraeus* sp. (det. G. C. Champion) in BM (1885–119), Bahia, numbered 3680 (error for 3860).

DIPTERA: In Dublin there are about 100 unidentified Diptera and 20 Hymenoptera as follows:— Agromyzidae, Bombyliidae, Calliphoridae (including *Cochliomyia macellaria* F. and *Lucilia eximia* Wiedemann, det. J. P. Dear), Ceratopogonidae, Chironomidae (*Cricotopus*, det. P. S. Cranston), Dolichopodidae (including *Condylostylus*, det. C. E. Dyte), Drosophilidae, Ephydridae (including *Nostima*, det. B. H. Cogan), Lauxaniidae, Mycetophilidae, Pipunculidae, Sarcophagidae (*Sarcodexia* and *Oxysarcodia*, det. J. P. Dear), Sciaridae, Sphaeroceridae, Stratiomyidae, Syrphidae (including *Ornidea obesa* F., det. K. G. V. Smith), Tachinidae, Tephritidae (*Xanthaciura ?insecta* Loew, det. B. H. Cogan), Therevidae.

HYMENOPTERA: Braconidae (Braconinae, Opiinae, Microgasterini, including *Apanteles*, det. T. Huddleston) and Ichneumonidae (Phygaduontinae).

Sphecidae: *Stigmus neotropicus* Kohl. one in BM (1885–119), Bahia, numbered 3860.

The following Chalcidoid Hymenoptera were described by Walker (1838, 1839) unless otherwise indicated. (See comments under entries 3528, 3561, and Notes).

Chalcididae: *Smiera punctata* F., *S. subpunctata.*

Encyrtidae: *Encyrtus epytus.*

Eucharitidae: *Eucharis furcata* F. (= *Thoracantha*), *E. rapo, Thoracantha latreilli* Guérin (Waterhouse, G. R., 1839, pl. xvii, fig. 3, see Fig. 17 of the present paper).

Eulophidae: *Elachestus catta. Entedon antander, E. hegelochus, E. thestius. Tetrastichus archideus, T. athenais, T. cacus, T. cleonica, T. daimachus, T. deilochus, T. februs, T. valerus.*

Eurytomidae: *Decatoma diphilus, Eurytoma euclus, E. menon.*

Lamprotatidae: *Lamprotatus dioxippe.*

Pteromalidae: *Pteromalus cosis, P. driopides.*

Torymidae: *Callimome caburus, C. sulcius.*

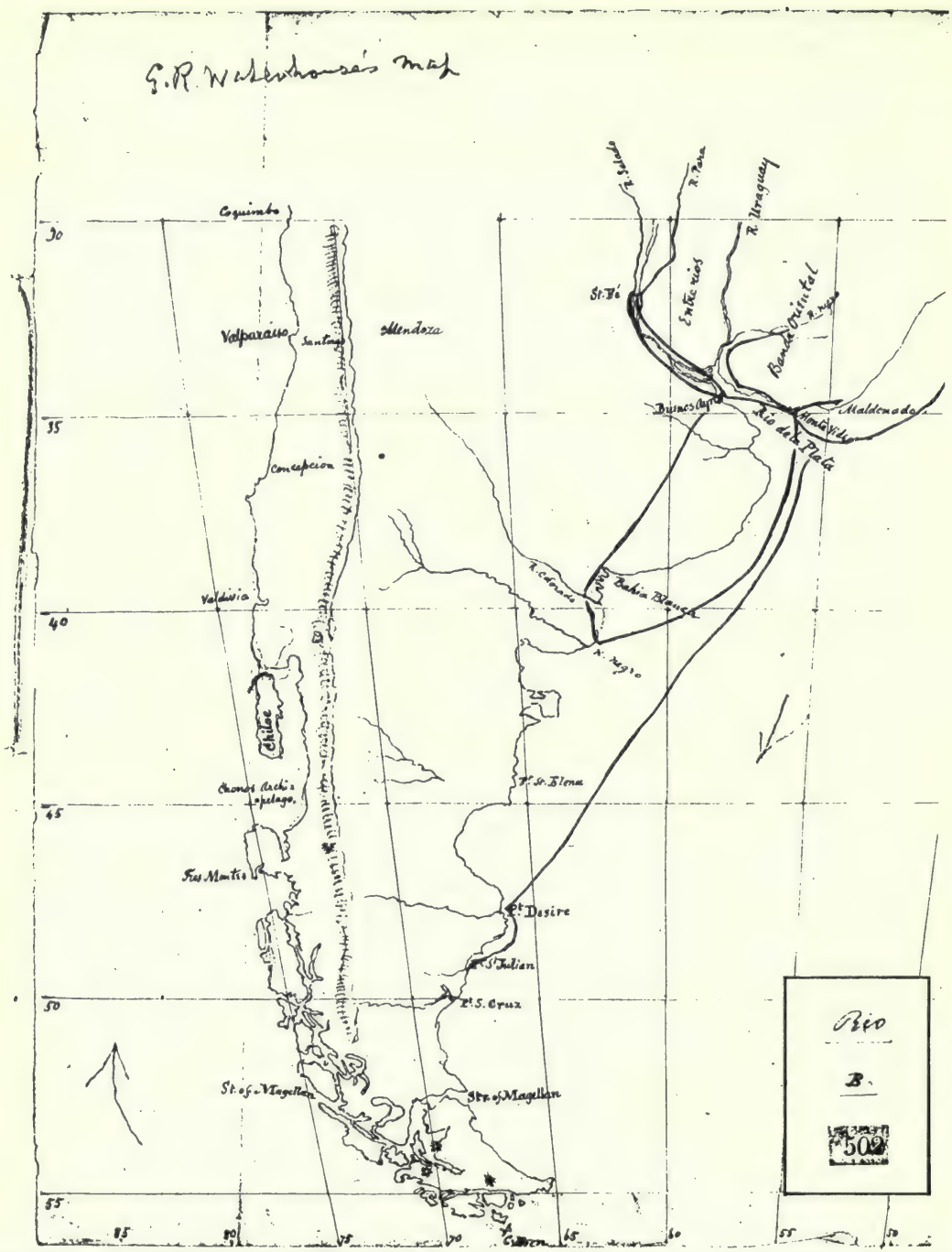

Fig. 19 G. R. Waterhouse's map inserted at the end of the *Insect Notes* and showing Darwin's route including his overland journeys in Uruguay and Argentina. The map is drawn on thin paper watermarked 'J. Whatman Turkey Mill 1840' with the route shown in red ink. In the copy reproduced here the route has been inked over in black for clarity.

Inset in panel is a 'Rio' label in Darwin's hand and a 'B' label also in his hand, probably connected with sorting of material and present on some specimens (see *Insect Notes*, 493). A Darwin Printed number is also shown. The majority of labels are in unknown hands (see text).

1836 *Insects* *26.*

3861. 3862. 3863. 3864. Insects. Bahia. August.
See entries 3858–3860.

3865. 3866. 3867. Insects. Ascension. July.
See entries 3823–3829.

The Notes end with G. R. Waterhouse's sketch map of South America (Fig. 19).

Eponyms

All generic and specific names formed from Darwin's name and used in the Insecta are included here with indications of author and group. Where these names have been used for Darwin's specimens, only author, date and page are given and the full reference will be found in the list of references and other comments elsewhere in the text (see Index). For names *not* based on Darwin material a full reference to the journal is given here which is not repeated in the main list of references. Where the name is not in Charles Darwin's honour, e.g. based on the town (Port) of Darwin (Northern Territory, Australia) (which, incidentally should more correctly have been coined *darwinensis* not *darwini*; similarly *darwinii* should have been *darwini*) etc., this is indicated. For the convenience of taxonomists in assessing the validity of any future eponyms all generic names are given first in alphabetical order (with full bibliographical data) and all specific eponyms are given in the alphabetical order of their original genera which are grouped into insect orders. Families and modern generic placings are also indicated where the latter information is already published. Some original dedications are quoted where of sufficient interest and reflect on Darwin's standing among entomologists of the day.

Considering Darwin's antipathy to the practice of taxonomists appending their names to new genera and species in perpetuity (Darwin, F., 1887: vol. 1, 364 et seq.), he would have probably been concerned at the superlative adulation of his name in the formation of so many eponyms.

Genera

Darwinella Enderlein, 1912, *Kungliga Svenska Vetenskapsakademiens Handlingar* **48**(3): 14. (Coleoptera, Tenebrionidae). Erected for *D. amaroides* Enderlein 1912. Falkland Islands. Not based on Darwin material.

Darwinhydrus Sharp, 1882, *Scientific Transactions of the Royal Dublin Society* (II)**2:** 373. (Coleoptera, Dytiscidae). Erected for *D. solidus* Sharp 1882. South Africa.

Darwinivelia Anderson & Polhemus, 1980, *Entomologica Scandinavica* **11:** 373. (Hemiptera, Mesoveliidae). Erected for *D. fosteri* Anderson & Polhemus 1980. Galapagos. Not based on Darwin material.

Darwinomyia Malloch, 1922, *Annals and Magazine of Natural History* (9) **9:** 277. (Diptera, Muscidae, *Palpibracus*). Erected for *D. univittata* Malloch 1922: 278. Chile. Not based on Darwin material.

Darwinysius Ashlock (1967). (Hemiptera, Lygaeidae). Erected for *Nysius ?marginalis* Dallas 1852: 556. Galapagos Islands. 'Named after Charles Darwin, who collected the type species of the genus on the voyage of the *Beagle*.'

Species

DERMAPTERA

Diplatys darwini Bey-Bienko 1959, *Entomologicheskoe Obozrenie* **38:** 591. (Diplatydae). China. Not based on Darwin material.

ORTHOPTERA

Anaulocomera darwinii Scudder 1893, *Bulletin of the Museum of Comparative Zoology Harvard* **25:** 19. (Tettigoniidae). Galapagos Islands. Not based on Darwin material.

ISOPTERA

Kalotermes darwini Light 1935, *Proceedings of the California Academy of (Natural) Sciences* (4) **21:** 242. (Kalotermitidae). Galapagos Islands. Not based on Darwin material.

Mastotermes darwiniensis Froggatt, 1896, *Proceedings of the Linnean Society of New South Wales* **21:** 519. (Mastotermitidae). Named after the town of Darwin, Australia.

ODONATA

Diplax frequens var *darwiniana* Selys 1883 (= *Sympetrum*, Libellulidae), *Annals de la Société Entomologique de Belgique* **27:** 14. Japan. Not based on Darwin material.

Tramea darwini Kirby 1889. (Libellulidae), *Transactions of the Zoological Society of London* **12:** 315. Galapagos Is. Not based on Darwin material.

HEMIPTERA

Alleloplasis darwini Waterhouse (G.R.) 1839: 194 (Derbidae). King George's Sound, Australia (Fig. 16).

'Named after this gentleman who has done so much towards the advancement of science, and to whom entomology owes so much, since he has brought to this country an immense collection of insects from the various parts of the world, and particularly of the minute species which had been comparatively neglected.'

Anipo darwini Evans (1942: 144). (Eurymelidae). King George's Sound, Australia.

Capsus darwini Butler, 1877: 89. (Miridae *Dagbertus*). Galapagos, Charles I.

Cephaloplatus darwini Distant, 1910. *Annals and Magazine of Natural History* **8**(6): 473 (Pentatomidae). Named after Port Darwin, N. Australia.

Corythaica darwiniana Drake & Froeschner, 1967, *Proceedings of the Entomological Society of Washington* **69:** 89. (Tingidae). Darwin Island (= Guerra, Culpepper), Galapagos.

Delphacodes darwini Muir (1929: 78). (Delphacidae). Chiloe Island, Chile.

Ectemnostega darwini Hungerford (1948: 203). (Corixidae). St Cruz, Patagonia.

Halobates darwini Herring, 1961, *Pacific Insects* **3**(2–3): 278. (Corixidae). Named after Port Darwin, N. Territory, Australia.

Haplodelphax darwini Fennah (1965: 33). (Delphacidae). King George's Sound, Australia.

Ischnodemus darwini Slater (1964: 116). (Lygaeidae). Cape of Good Hope, South Africa. 'Dedicated to the memory of its collector, the immortal Charles Darwin'.

Kaapia darwini Theron (1983: 148). (Cicadellidae). Cape of Good Hope, South Africa.

Melizoderes darwini Funkhouser (1934: 203). (Aetalionidae). Chiloe Island, Chile.

Ontiscus darwini Hamid (1975: 42). (Lygaeidae). King George's Sound and Sydney, Australia.

Pantinia darwini China 1962, *Transactions of the Royal Entomological Society of London* **114**(5): 151, Fig 12. (Peloridiidae). Chiloe Island, Chile. Not a Darwin specimen.

Pristhesancus darwinensis Miller, 1958, *Nova Guinea* (N.S.) **9:** 156. (Reduviidae). Named after the town of Darwin, Australia.

Risius darwini Fennah (1962: 233). (Dictyopharidae). Cape of Good Hope, South Africa.

Stagira darwini Distant (1905: 213). (Cicadidae). Mauritius.

Stenoconchyoptera darwini Muir (1931: 308). (Tropiduchidae). Cape of Good Hope, South Africa.

NEUROPTERA

Brachynemorus darwini Stange, 1969, *Acta Zoologica Lilloana* **25:** 19. (Myrmeleontidae). Galapagos Islands. Not based on Darwin material.

Chrysopa darwini Banks, 1940, *Psyche, a Journal of Entomology*, Cambridge, Mass. **47:** 135. (Chrysopidae). Named after the town of Darwin, Australia.

Macronemurus darwini Banks, 1915, *Proceedings of the Academy of Natural Sciences of Philadelphia* **96:** 619. (Macronemuridae). Named after the town of Darwin, Australia.

Megalomus darwini Banks, 1924, *Zoologica. Scientific Contributions of the New York Zoological Society*, **5**(717): 179. (Hemerobiidae). Galapagos Islands. Not based on Darwin material.

COLEOPTERA

Ablechrus darwinii Waterhouse (C.), 1877: 81. (Melyridae, listed in error for *Ablechrus flavipes* Waterhouse (C.), 1877: 79).

Achryson galapagoense darwini Linsley and Chemsak, 1966, *Proceedings of the California Academy of Sciences* (4) **33:** 213. (Cerambycidae). Galapagos Islands. Not based on Darwin material.

Adelopsis darwini Jeannel (1936: 64, 66). (Leiodidae). Maldonado, Uruguay.

Agonum darwini Van Dyke 1953, *Occasional Papers of the California Academy of Sciences*, **22:** 25. (Carabidae). Galapagos Islands. Not based on Darwin material.

Agrilus darwinii Wollaston, 1857, *Catalogue of the Coleopterous insects of Madeira in the collection of the British Museum*. London, p. 82 (Buprestidae). Madeira. Not based on Darwin material. Wollaston says:

'I have dedicated this species to Charles Darwin Esq., M.A., V.P.R.S., whose enquiries into the obscurer phenomena of geographical zoology have contributed more than those of any other man living to our knowledge, in the general questions of animal distribution'.

Anaploderma darwini Lameere, 1902, *Bulletin et Annals de la Société Royale Entomologique de Belgique* **46:** 210. (Cerambycidae). Brazil. Not based on Darwin material.

Archophileurus darwini Arrow, 1937: 55. (Scarabaeidae, Dynastinae). Maldonado, Uruguay.

Atheta (Acronota) darwini Cameron, 1943, *Annals and Magazine of Natural History* (11) **10:** 351. (Staphylinidae). Named after Port Darwin, Australia.

Aulonodera darwini Champion, 1918*b*: 51. (Halticidae). Chiloe Island, Chile.

Callimicra darwini Hespenheide, 1980: 15. (Buprestidae). Bahia, Brazil.

Calosoma darwini Van Dyke, 1953, *Occasional Papers of the California Academy of Sciences,* **22:** 10. (Carabidae). Galapagos Islands. Not based on Darwin material.

Carabus darwinii Hope, 1838: 129. (Carabidae, s.g. *Ceroglossus*). Chiloe Island, Chile.

'This beautiful insect I have named in honour of my friend Charles Darwin, Esq., a zealous entomologist. His exertions in advancing the progress of Zoology in general entitle him to thanks of the scientific world.' Kraatze's (1878, *Dt. ent. Z.* **22:** 325) citation of this name probably refers to another species which has led to *'darwinii* Kraatze' entries in catalogues, similarly with Gerstaecker (1858, *Linn. Ent.* **12:** 435).

Carenum darwiniense Macleay, 1878, *Proceedings of the Linnean Society of New South Wales* **2:** 214. (Carabidae). Named after Port Darwin, Australia.

Chlamydopsis formicola King var. *darwinensis* Lea, 1918, *Record of the South Australian Museum* **1:** 85. (Histeridae). Named after the town of Darwin, Australia.

Clivina darwini Sloane, 1916, *Proceedings of the Linnean Society of New South Wales* **41:** 609. (Carabidae). Named after Port Darwin, Australia.

Coelostoma darwini Blair, 1933, *Annals and Magazine of Natural History* (10) **11:** 474. (Hydrophilidae, *Galapodacnum*). Galapagos Islands. Not based on Darwin material.

Coenonica darwini Cameron, 1943, *Annals and Magazine of Natural History* **11**(10): 347. (Staphylinidae). Named after the town of Darwin, Australia.

Colymbetes darwini Babington, 1842: 8. (Dytiscidae, (= *Rhantus signatus* F.)). Tierra del Fuego.

Cormodes darwinii Pascoe, 1860, *Journal of Entomology,* **1:** 17. (Cleridae). Lord Howe Island. (Fig. 18).

'An insect so suggestive of Mr Darwin's theory should appropriately bear his name.' This dedication refers to the wingless condition of this beetle 'a condition due, as Mr Darwin tells us, in reference to other insular apterous Coleoptera, to "the action of natural selection but combined probably with disuse" '.

Ctenispa darwini Maulik, 1930: 51. (Chrysomelidae). Bahia, Brazil.

Diastichus darwini Cartwright, 1970, *Proceedings of the Biological Society of Washington,* **83:** 53. (Scarabaeidae, *Platytomus*). Galapagos Islands. Not based on Darwin material.

Distigmoptera darwini Scherer, 1964: 297. (Chrysomelidae). Uruguay, (Fig. 17).

Docema darwini Mutchler, 1924, *Zoologica, Scientific Contributions of the New York Zoological Society,* **5:** 230. (Halticidae). Galapagos Islands. Not based on Darwin material.

Dorcus darwinii Hope, 1841: 302, 1844: 279. (Lucanidae, = *Sclerognathus femoralis* Guérin). Chile.

Hope (1844) says 'The above insect lately received from Chile. It is named in honour of Charles Darwin Esq., who has greatly contributed to our acquaintance with the entomology of Valparaiso, Chile, and other parts of the South American continent'.

Epitrix darwini Bryant, 1942: 101. (Chrysomelidae). Maldonado, Uruguay.

Epuraea darwinensis Blackburn, 1927, *Transactions of the Royal Society of Australia* **27:** 115. (Nitidulidae). Australia. Not based on Darwin material.

Eudicella darwiniana Kraatz, 1840, *Deutsche Entomologische Zeitschrift* **24**(1): 170 (= *darwini* Kraatz, 1890, *antea* **34**(1): 216). (Scarabaeidae). Ashanti, Africa. Not based on Darwin material.

Gnathaphanus darwini Blackburn, 1888. *Proceedings of the Linnean Society of New South Wales* **13:** 808. (Carabidae). 'Northern Territory of South Australia'. Not Darwin material.

Haptoncura darwinensis Blackburn, 1903, *Transactions of the Royal Society of Southern Australia* **27:** 115. (Nitidulidae). Named after the town of Darwin, Australia.

Heterodiomus darwini Brèthes, 1924: 155. (Coccinellidae). Rio de Janeiro, Brazil.

Heteronyx darwini Blackburn, 1889, *Proceedings of the Linnean Society of New South Wales,* **14:** 435. (Scarabaeidae). 'N. Territory of S. Australia'. Not based on Darwin material.

Hugoscottia darwini Knisch, 1922: 90. (Hydrophilidae, = *Enochrus*). South America—no further locality; see comment in introduction and *Insect Notes,* 1314.

Hydroporus darwinii Babington, 1842: 13. (Dytiscidae, *Necterosoma*). King George's Sound, Australia.

Hyperaspis arrowi Brèthes var *darwini* Brèthes 1925*a*: 13. (Coccinellidae). Maldonado, Uruguay.

Idiocephala darwini Saunders, 1843: 317. (Chrysomelidae). Sydney, Australia.

Lepidiota darwini Blackburn, 1888, *Proceedings of the Linnean Society of New South Wales,* **13:** 850. (Scarabaeidae, Melolonthiinae). Northern Territory of South Australia. Not based on Darwin material.

Longitarsus darwini Bryant, 1942: 105. (Chrysomelidae). Maldonado, Uruguay.
Medon (Hypomedon) darwini Cameron, 1943, *Annals and Magazine of Natural History*, (11) **10:** 341. (Staphylinidae). Named after the town of Darwin, Australia.
Migadops darwinii Waterhouse, (G.R.), 1842*a*: 138. (Carabidae). Tierra del Fuego, Navarin Island.
Neobrachypterus darwini Jelinek, 1979: 194. (Nitidulidae). Bahia Blanca, Patagonia.
Nephopullus darwini Brèthes, 1924: 168. (Coccinellidae, *Scymnus*). Rio de Janeiro, Brazil.
Nyctelia darwinii Waterhouse (G.R.), 1842*b*: 108. (Tenebrionidae). Port Desire, Patagonia.
Odontoscelis darwini Waterhouse (G.R.), 1840*a*: 356. (Carabidae, *Cnemacanthus*). Patagonia, (Fig. 13).
Onthophagus darwini Paulian, 1937, *Arbeiten über morphologische u. taxonomische Entomologie*, **4:** 345 (now synonymized with *O. fissiceps* McCleay). (Scarabaeidae). Named after the town of Darwin, Australia.
Orynipus darwini Brèthes, 1924: 158. (Coccinellidae). Chiloe Island, Chile.
Oxytelus (Anotylus) darwini Cameron, 1843, *Annals and Magazine of Natural History* (11) **10:** 339. (Staphylinidae). Named after the town of Darwin, Australia.
Oxytelus (Anotylus) darwinianus Cameron, 1943, *Annals and Magazine of Natural History* (11) **10:** 340. (Staphylinidae). Named after the town of Darwin, Australia.
Parahelops darwini Waterhouse (C.O.), 1875: 334. (Tenebrionidae). Tierra del Fuego and Valparaiso.
Phalacrus darwinii Waterhouse (C.O.), 1877: 78. (Phalacridae). Galapagos, Charles Island.
Phytosus darwinii Waterhouse (F.H.), 1879: 531. (Staphylinidae, *Halmaeusa*). Falkland Islands.
Plagithmysus darwinianus Sharp, 1896, *Entomologist's Monthly Magazine*, **32:** 271. (Cerambycidae). Hawaii. Not based on Darwin material.
Plotopuserica darwiniana Brenske, 1900, *Berliner Entomologische Zeitschrift*, **45:** 59. (Scarabaeidae). Madagascar. Not based on Darwin material.
Polylobus darwini Bernhauer, 1935: 96. (Staphylinidae). Chiloe Island, Chile.
Psephenus darwinii Waterhouse, C.O., 1880: 563 (Psephenidae). Rio de Janeiro.
Sclerostomus darwini sensu Burmeister is a misidentification (for *Sclerognathus bacchus* Hope) of *Dorcus darwinii* Hope see above.
Scolytogenes darwini Eichoff, 1878, *Mémoires de la Société Royale des Sciences de Liège* (2) **8:** 497. (Scolytidae). Burma. Not based on Darwin material.
Stictospilus darwini Brèthes, 1924: 154. (Coccinellidae). Chile.
Telephorus darwinianus Sharp, 1866, *Transactions of the Entomological Society of London*, **5:** 436. (Cantharidae, = *Cantharis darwiniana*). Scotland. Not based on Darwin material.
Trechisibus darwini Jeannel, 1927: 38. (Carabidae). Argentina. Not based on Darwin material though other Darwin records are given for other species. Dedication as follows: 'Cette espèce est dédiée à Ch. Darwin dont une partie des récoltes, faites au cours du voyage du Beagle, m'ont été communiquées par le British Museum et m'ont grandement facilité la revision du groupe difficile des *Trechisibus*.'
Trichopteryx darwini Matthews, 1889: 193. (Trichopterygidae). Rio de Janeiro (= *Acrotrichis*, Ptiliidae). Matthews says 'I feel much pleasure in dedicating this insect to the memory of the late C. R. Darwin by whom it was found in a fungus near Rio de Janeiro'.

DIPTERA

Leptocera (Limosina) darwini Richards, 1931: 80. (Sphaeroceridae). Concepcion.
Leskia darwini, Emden, 1960, *Proceedings of the Zoological Society of London*, **134:** 391. (Tachinidae). South Africa. Not based on Darwin material.
Nocticanace darwini Wirth, 1969, *Proceedings of the California Academy of Sciences*, (4) **36:** 585. (Canaceidae). Galapagos. Not based on Darwin material.
Ogcodes darwini Westwood, 1876: 516. (Acroceridae). Australia.
Parachlus darwini Brundin, 1966, *Kuniliga Svenska Vetenskapsakademiens Handlingar* (4) **11**(1): 172. (Chironomidae). Chile. Not based on Darwin material.
Paracleis darwini Parent, 1933, *Annales de la Société Scientifique de Bruxelles*, **53:** 184. (Dolichopodidae). Named after the town of Darwin, Australia.
Pelecorhynchus darwini Ricardo, 1900: 102. (Tabanidae). Chiloe.
Pelycops darwini Aldrich, 1934: 169. (Tachinidae). Tierra del Fuego.
Strongyloneura darwini Curran, 1938, *American Museum Novitates*, **985:** 3. (Calliphoridae, *Isomyia*). Named after the town of Darwin, Rhodesia. Not based on Darwin material.
Tabanus darwinensis Taylor, 1917, *Proceedings of the Linnean Society of New South Wales*, **48:** 758. (Tabanidae, = *Dasybasis clavicallosa* Ricardo). Named after the town of Darwin, Australia.
Valdivia darwini Shannon, 1927: 32. (Syrphidae, *Valdiviomyia*) Chile.

LEPIDOPTERA

Agarista darwiniensis Butler, 1884, *Annals and Magazine of Natural History* (5) **14:** 406. (Noctuidae, *Cruria*). Named after the town of Darwin, Australia.

Aplodes rubrofrontaria var. *darwiniata* Dyar, 1904, *Proceedings of the United States National Museum,* **27:** 903. (Geometridae, *Nemoria*). British Columbia. Not based on Darwin material.

Argynnis darwini Staudinger, 1899, Lepidoptera in *Ergebnisse Hamburger Megalahhaensische Sammelreise Hamburg,* **4**(7) (1898): 32. (Nymphalidae, = *Issoria lathonioides* (Blanchard)). Tierra del Fuego. Not based on Darwin material.

Coenonympha arcania subsp. *darwiniana* Staudinger, 1871, *Catalog der Lepidopteren des Palaearctischen Faunengebietes* **2:** 32. (Satyridae). Alps. Not based on Darwin material.

Erechthias darwini Robinson, 1983: 304. (Tineidae). St Paul's Rocks. Not based on Darwin's material but conspecific with material he collected.

Hypolimnas alimena darwinensis Waterhouse (G.A.) & Lyell (G.), 1914, *The Butterflies of Australia* 60. (Nymphalidae). Named after the town of Darwin, Australia.

Mimacraea darwinia Butler, 1872, *Lepidoptera Exotica* **104,** pl. 38, f. 8 (Lycaenidae). West Africa. Not based on Darwin material.

Orthosia ? darwini Staudinger, 1899, Lepidoptera in *Ergebnisse Hamburger Megalahhaensische Sammelreise Hamburg* **4**(7) (1898): 74. (Noctuidae). 'Uschuaia'. Not based on Darwin material.

Phlyctaenodes darwinalis Sauber, 1904, *Verhandlungen des Vereins für Naturwissenschaftliche Unterhaltung zu Hamburg,* **12:** 109. (Pyralidae, *Loxostege*). Central Asia. Not based on Darwin material.

Pieris napi bryonia (subsp. *darwiniana*) Stichel, 1910, *Berliner Entomologische Zeitschrift,* **55:** 251. (Pieridae). Europe. Not based on Darwin material.

Utetheisa pulchelloides subsp. *darwini* Jordan, 1939: 283. (Arctiidae). Keeling Islands.

HYMENOPTERA

Achrysocharis darwini Girault, 1917, *New Chalcid Flies:* 5 (privately published). (Eulophidae). Maryland. Not based on Darwin material.

Anastatus darwini Girault, 1915, *Memoirs of the Queensland Museum,* **4:** 24. (Eupelmidae). Queensland. Not based on Darwin material.

Anthophora darwini Cockerell, 1910, *Annals and Magazine of Natural History* (8) **5:** 409. (Anthophoridae). Named after the town of Darwin, Australia. Not based on Darwin material.

Ceratina darwini Friese, 1910, *Deutsche Entomologische Zeitschrift* **1910:** 700. (Xylocopidae). South America. Not based on Darwin material.

Coelioxys albolineata var. *darwiniensis* Cockerell, 1929, *American Museum Novitates,* **346:** 8. (Megachilidae). Named after the town of Darwin, Australia.

Corynura darwini Cockerell, 1901. *Proceedings of the Academy of Natural Sciences of Philadelphia,* **53:** 220. (Halictidae, *Rhinocorynura*). Brazil.

Crocisa caeruleifrons Kirby var. *darwini* Cockerell, 1905, *Annals and Magazine of Natural History* (7) **16:** 219. (Anthophoridae). Named after the town of Darwin, Australia.

Foenus darwinii Westwood, 1841: 537; 1844: 259 (Gasteruptiidae, *Hyptiogaster*). Australia.

Gonatocerus darwini Girault, 1912, *Memoirs of the Queensland Museum* **1:** 131. (Trichogrammatidae). Queensland. Not based on Darwin material, but dedicated respectfully to him.

Halictus (Evylaeus) darwiniellus Cockerell, 1932: 519 (Halictidae). Sydney, Australia.

Halictus eyrei darwiniensis Cockerell, 1929, *American Museum Novitates,* **346:** 2. (Halictidae, *Homalictus*). Named after the town of Darwin, Australia.

Megachile darwiniana Cockerell, 1906, *Annals and Magazine of Natural History* (7) **17:** 535. (Megachilidae). Named after the town of Darwin, Australia.

Nitela darwini Turner, 1916: 345. (Sphecidae). Galapagos Islands.

Nomia darwinorum Cockerell, 1910, *Annals and Magazine of Natural History* (8) **5:** 502. (Halictidae). Named after the town of Darwin, Australia.

Paralaster darwinianus Perkins, 1914, *Proceedings of the Zoological Society of London* **1914:** 617. (Eumenidae). Named after the town of Darwin, Australia.

Pediobomyia darwini Girault, 1913, *Memoirs of the Queensland Museum* **2:** 155. (Eulophidae). Nelson, ? Western Australia. Not based on Darwin material.

Polynema darwini Girault, 1913, *Memoirs of the Queensland Museum* **2:** 122. (Mymaridae). Queensland, Australia. Not based on Darwin material.

Selitrichodes darwini Girault, 1915, *Memoirs of the Queensland Museum* **3:** 233. (Pteromalidae). Queensland. Not based on Darwin material.

Sphex darwinensis Turner, 1912, *Annals and Magazine of Natural History* (8) **10:** 56. (Sphecidae). Named after the town of Darwin, Australia.

Tetrastichus darwini Girault, 1913, *Memoirs of the Queensland Museum* **2:** 202. (Eulophidae). Nelson, ? Western Australia. Not based on Darwin material.

Thynnus darwinensis Turner, 1908, *Proceedings of the Linnean Society of New South Wales* **33**(1): 206. (Thynnidae). Named after Darwin, Australia.

Xylocopa darwini Cockerell, 1926, *Annals and Magazine of Natural History* (9) **17:** 659. (Xylocopidae). Galapagos Islands. Not based on Darwin material.

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Notes

For further details of certain entries in these Notes see Freeman (1978) and for obituaries of entomologists, throughout the text, see Gilbert (1977). See also textual comments via the index.

1. William Darwin Fox (1805–80). C.D.'s second cousin. Vicar of Delamere, Cheshire (1838–73). At Christ's College, Cambridge during C.D.'s first two terms of residence. Albert Way (1805–74). Antiquary. Friend of C.D. at Cambridge where they collected beetles.

   Leonard Jenyns (later Blomefield) (1800–93). Anglican priest and naturalist. Vicar of Swaffham Bulbeck, Camb. Henslow's brother-in-law. Was asked (as was Henslow) to join *Beagle* as naturalist before Darwin but declined (Winwood, 1894, *Proc. Bath nat. Hist. antiq. Fld Club* **8**(1): 35–55, portrait). Wrote (1862) *Memoir of John Stevens Henslow*, with recollections by C.D. and the section on fishes in the *Zoology of the Beagle* (1840–42) (see also Darwin, F., 1903). There are some British C.D. insect specimens in his collection at Cambridge, also his notebooks.

   Sir. Harry Stephen Meysey Thompson, Bart. (1809–74). Agriculturist. M.P. for Whitby 1859–65. Cambridge Friend of C.D.
2. John Maurice Herbert (1808–82). County Court judge on the Monmouth and Cardiff circuit. Close friend of C.D. at Cambridge. Collected beetles with C.D. at Barmouth, N. Wales. Gave C.D. his Coddington microscope.
3. Revd Frederick William Hope (1792–1862). Entomologist and print collector, FRS 1834, Founder of the Hope Chair of Zoology (Entomology) Oxford. In 1829 gave C.D. *ca.* 160 specimens of beetles from his collection in London. Collected in Barmouth with C.D. but due to illness (eczema of lips, see C.D. to Fox July 3rd, 1829) C.D. returned to Shrewsbury after two days (see Stephen's List of British captures). C.D. gave Hope beetles from the *Beagle* voyage; see C.D.'s letter to Hope about Australian insects (Poulton, 1909), and letter from Babington to C.D. in Cambridge University Library.
4. John Obadiah Westwood (1805–93). Solicitor and entomologist. First Hope Professor of Zoology (Entomology) in the University of Oxford (1861–91). Proposed to the last University Commission the permanent endowment of a lecturer to combat the 'errors of Darwinism'. Ironically C.D. had proposed Westwood for the Royal Medal of the Royal Society in 1855.
5. Revd John Stevens Henslow (1796–1861). Professor of Mineralogy at Cambridge (1822–27), then Professor of Botany (1827–61). Vicar of Hitcham, Suffolk (1837–61). FRS 1818. At Cambridge C.D. was known as 'the man who walked with Henslow'. Became strong personal friend of C.D. and looked after the collections sent back from the Beagle, see Jenyns, 1862, *Memoir of John Stevens Henslow* with recollections by C.D., and Barlow (1967).
6. Syms Covington (1813–61). 'Fiddler and boy to the poop cabin' on the *Beagle*. Became personal servant to C.D. on 22 May, 1833 and later secretary amanuensis until 25 February, 1839. He copied out the *Insect Notes* (and others, see Sulloway 1982, Porter 1983), much of the MS of the book on *Coral-reefs* and extracts later used in *Variation in Animals and Plants*. He also collected Australian barnacles for C.D. for use in his Cirripede monograph. In 1840 he emigrated to New South Wales but corresponded with C.D. until 1859. See De Beer (1959) and Ferguson (1971). Manuscript material on Covington, including a *Beagle* diary and drawings, is held in the archives of the Linnean Society of New South Wales at the Mitchell Library in Sydney.
7. Robert FitzRoy (1805–65), RN, hydrographer and meteorologist, in command of the *Beagle*. FRS 1851. Edited (1839) *Narrative of the Surveying Voyages of His Majesty's Ships Adventure and Beagle*. Anti-Darwin in later life. Governor General of New Zealand (1843–45). There is FitzRoy material preserved in the Michael Faraday Correspondence collection at the Institute of Electrical Engineers and his own account of the discoveries of the *Beagle* at the Royal Geographical Society (see also 1836, *J. R. geogr. Soc.* **6:** 311–343).
8. Benjamin Bynoe (*ca.* 1804–1865). Assistant surgeon on the *Beagle* and Acting Surgeon from April 1832 when the Surgeon, Robert McCormick, returned to England. Made official collections of plants, birds and possibly insects (see section on 'other locations' of collections via Haslar Hospital). Looked after C.D. during his illness in Valparaiso.

9. Charles Cardale Babington (1808–95). Botanist. FRS 1851. Succeeded Henslow as Professor of Botany at Cambridge, 1861. He, like Darwin, was an original member of the Entomological Society of London and a keen entomologist in his early days. His collection and notebooks, including records of C.D.'s British captures are in the Cambridge University Museum of Zoology. He described C.D.'s *Beagle* Dytiscidae (1842) and there is a letter from him to C.D. in the Cambridge University Library which discusses this.

10. George Robert Waterhouse (1810–88). Mammalogist and entomologist. Keeper of Mineralogy and Geology at the British Museum (Natural History). Friend of C.D. and frequent visitor to Down House. Wrote section of *Living Mammalia* in the *Zoology of the Voyage of the Beagle*. In 1843 C.D. wrote of him 'If Waterhouse is hired he will enjoy his seven shillings a day from the British Museum as much as most men would ten times the sum!' (see *Life and Letters,* Darwin, F., 1887: vol. 1, 344). In the *Journal* Darwin (1845:30, footnote) says 'I am greatly indebted to Mr Waterhouse for his kindness in naming for me this and many other insects, and in giving me much valuable assistance.' He (G.R.W.) and two of his three Coleopterist sons (Charles Owen and Frederick Herschel) described most of C.D.'s beetles (see references). For obituary notes of these three entomologists see *Entomologist's mon. Mag,* 1888, **24:** 233–4; 1917, **15:** 67–68 and 1920, **56:** 17; others are cited in Gilbert (1977).

11. Francis Walker (1809–74). Entomologist. Assistant at the British Museum. Renowned for his prolific output of inadequate descriptions of new species (over 20,000 in all) such that an unsigned obituary [actually by J. T. Carrington] in the *Entomologist's Monthly Magazine* (1874, **11:** 140–141) began 'More than twenty years too late for his scientific reputation, and after having done an amount of injury almost inconceivable in its immensity, Francis Walker has passed from among us'. On the other hand no lesser an entomologist than Edward Newman (1874, *Entomologist,* **7:** 260–264) described him as the 'most voluminous and most industrious writer on Entomology this country has ever produced' and said of him 'I never met anyone who possessed more correct, more diversified, or more general information, or who imparted that information to others with greater readiness and kindness'.

His 'Catalogues of Insects in the British Museum Collections' will always stand as a tribute to his industry. Walker (1836) also described the Diptera from Captain P. P. King's collection made on the first surveying voyage of *Adventure* and *Beagle*.

Fortunately, many of his descriptions of Darwin's insects will endure because they were of little known groups from little worked regions and most of his types are still in the British Museum (Natural History).

For a recent balanced account of this remarkable man see Graham (1979).

12. Alexander Henry Haliday (1807–70). Entomologist and lifelong correspondent of Francis Walker. High Sheriff of Antrim 1843. Haliday described (1836) the Hymenoptera collected by Captain King's first surveying voyage on the *Adventure* and *Beagle* (see FitzRoy, 1839), John Curtis (1839, 1845) described the Coleoptera and Francis Walker (1836) the Diptera. Haliday's collections, including some C.D. specimens, are in the National Museum of Ireland (see O'Connor & Nash, 1982). See also comments under Walker (1840–1842) in References.

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Geographical and Name Index

In addition to geographical place names this index includes the names of institutions, ships and the more important textual references to historic persons associated with Darwin and/or his insects.

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Charles Darwin's Notebooks, 1836–1844

Transcribed & Edited by

Paul H. Barrett	Michigan State University
Peter J. Gautrey	Cambridge University Library
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David Kohn	Drew University
Sydney Smith	St Catharine's College Cambridge

Darwin's notebooks provide an invaluable record of his scientific thinking and, most importantly, the development of his theory of natural selection. This edition of the notebooks, prepared to the highest modern standards of textual editing, thus affords a unified view of Darwin's professional interests.

The *Red Notebook*, used on the voyage of H.M.S. *Beagle* and afterwards in England, contains Darwin's first evolutionary statements. In July of 1837, Darwin began his 'Transmutation Notebooks' (B–E) devoted to the solution of the species problem, and in the third notebook of this series he first formulated the theory of natural selection. To this can now be added another species notebook reconstructed from loose sheets; this 'Torn-Apart Notebook' represents the fifth Transmutation Notebook.

This volume also contains Notebook A on geology, Notebooks M and N on man and behaviour, and other notebook and manuscript materials from the period 1836–1844.

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Duncan M. Porter (Editor)

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Darwin's notes on *Beagle* plants

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Introduction

Charles Darwin is not usually thought of as a botanist, even though later in life he published several books on different aspects of plant life, based in part on personal experiment. Some of his recollections of early childhood, however, indicate an early interest in the plant kingdom. For example, in his autobiography (Barlow, 1958: 22–23) he wrote that at age eight, when he began to attend school in Shrewsbury:

> my taste for natural history, and more especially for collecting, was well developed. I tried to make out the names of plants, and collected all sorts of things, shells, seals, franks, coins, and minerals. The passion for collecting, which leads a man to be a systematic naturalist, a virtuoso or a miser, was very strong in me, and was clearly innate, as none of my sisters or brother ever had this taste.

This 'passion for collecting' continued through the voyage of HMS *Beagle* (December 1831–October 1836) and beyond, but following the voyage it turned from collecting specimens to collecting information.

Although his primary interests on the voyage were geology and zoology, Darwin collected plants and made observations on vegetation as well (Porter, 1980*a*). In his first letter to his mentor, the Revd John Stevens Henslow (1796–1861, Professor of Botany at the University of Cambridge), Darwin wrote on 18 May 1832 from Rio de Janeiro, Brazil: 'Geology & the invertebrate animals will be my chief object of pursuit through the whole voyage.' (Burkhardt & Smith, 1985*b*: 237). Indeed, he kept to this bearing throughout the voyage. On 20 July 1834, Darwin wrote to his sister Catherine (Emily Catherine Darwin, 1810–66) from the *Beagle*, 'a hundred miles South of Valparaiso', Chile: 'You ask me about the specimens which I send to Cambridge I collect every living creature, which I have time to catch & preserve; also some plants.' (Burkhardt & Smith, 1985*b*: 391). The collections were sent to Henslow in Cambridge, who was to hold them for Darwin's return (Porter, 1985).

Concerning the plant collections, Henslow wrote on 30 January 1836 to William Jackson Hooker (1795–1865, then Regius Professor of Botany at Glasgow University), who was helping Henslow to identify Darwin's plants: 'Darwin's letters contain very little Botanical allusion, as he is no Botanist—His collections were made to please me—' (Porter, 1984: 109). This point is emphasized in Henslow's letter to Darwin of 15–21 January 1833. Having received the first consignment of specimens from South America, Henslow is full of advice on collecting methods. Besides instructions on geology, zoology, and botany, he includes, 'Most of the plants are very desirable to *me*', and 'The Lichens are *good things* as scarcely any one troubles himself to send them home—' (Burkhardt & Smith, 1985*b*: 293, 294). Perhaps this helps explain why Darwin went out of his way to collect so many plant specimens while on the voyage.

Besides merely collecting specimens, Darwin kept notes on these specimens and made observations on places visited and objects seen. He kept several kinds of records, which are well discussed by Burkhardt & Smith (1985*b*: 545–548). The *Field Notebooks* are small pocket notebooks, used for notes and initial impressions while travelling. The *Diary*, or *Journal* as it was called by Darwin, contains day-by-day discussions of where he went, what he did, and what he saw. It was sent home to his family periodically, but it did not substitute for letters, which are now printed *in toto* in Burkhardt's & Smith's (1985*b*) magnificent work. Darwin wrote to his sister Caroline (Caroline Sarah Darwin, 1880–88) on 25 April 1832 from Rio de Janeiro (Burkhardt & Smith, 1985*b*: 226, 227):

> I send in a packet, my commonplace Journal.—I have taken a fit of disgust with it & want to get it out of my sight, any of you that like may read it.—a great deal is absolutely childish: Remember however this, that it is written solely to make me remember this voyage, & that it is not a record of facts but of my thoughts.—& in excuse recollect how tired I generally am when writing it.— . . .
>
> Be sure you mention the receiving of my journal, as anyhow to me it will of considerable future interest as it [is] an exact record of all my first impressions & such a set of vivid ones they have been, must make this period of my life always one of interest to myself.—If you will speak quite sincerely,—I should be glad to have your criticisms. Only recollect the above mentioned apologies.—

In spite of Darwin's reservations about his diary, it still bears reading, and relevant passages are cited later in this paper. It was the main source to Darwin for his *Journal of Researches* (Darwin, 1839, 1845), and it has appeared in slightly edited (Barlow, 1933) and facsimile (Darwin, 1979) editions. Excerpts below are from his granddaughter Lady Barlow's version of the *Diary*.

The zoological and geological observations made by Darwin were recorded in a *Zoological Diary*[1] and a *Geological Diary* and *Geological Notes*. Although these have not been published as written, the first was used extensively for the five volume *Zoology of the Beagle* (Darwin, 1838–43), and the others for the three volumes subtitled *The Geology of the Voyage of the Beagle* (Darwin, 1842, 1844, 1846). A number of the early papers, particularly the geological ones reprinted in Barrett (1977), also originated in these notes.

One surprising thing about the *Zoological Diary* is that about twenty per cent of its 368 pages are devoted to notes on plants, including fungi and lichens. Most of these notes describe and discuss plants collected by Darwin; others are general observations on vegetation. Those relevant to the present paper are printed below in discussions of the specimens to which they refer.

Finally, there are 10 notebooks devoted to specimens collected on the *Beagle*'s voyage. The four *Geological Specimen Notebooks* enumerate the fossil and mineralogical specimens collected. The six *Specimen Notebooks* are in two series. Three are titled *Printed Numbers*, the other three *Catalogue for Specimens in Spirits of Wine*. The latter are numbered independently of the first two. Specimens with paper labels (dried specimens) were entered into either the *Geological Specimens Notebooks* or the *Printed Numbers Notebooks*, depending upon whether they were inanimate or animate, fossil or recent. Specimens fixed in spirits were given metal labels, placed in bottles or jars, and entered into the *Specimens in Spirits of Wine Notebooks*. The latter, the *Printed Numbers Notebooks*, and the *Field Notebooks* are now in the Darwin collection at Down House, Darwin's residence in Downe, Kent, as is the *Diary*. The Darwin Archives at the Cambridge University Library house the *Zoological Diary* (DAR 30, 31), *Geological Diary* (DAR 32, 33), the *Geological Notes* (DAR 34 to 38), and the *Geological Specimen Notebooks* (DAR deposit).

For some time, I have wondered why Darwin kept so many and such detailed series of notes on his collections and observations on his travels while on the voyage. He had previously kept a short notebook of observations dated March and April 1827 on marine invertebrates and on the pollen and floral anatomy of a geranium (reprinted in Barrett, 1977), written while he was a student at the University of Edinburgh. According to Bailey & Gosse (1960), there are also two items in the Darwin Archives, which I have not examined, that bear on this subject: *Zoological walk to Porto bello* [*c.* 1826][CD] (DAR 5) and *Diary for 1826, with entries about birds, beasts and flowers seen on walks*. (DAR 129). However, there is no evidence that similar notebooks were compiled while he was a student at Cambridge during 1828–31, in spite of his increasing interest in entomology and geology.

Perhaps he was compelled to begin again by information sent him by his sister Caroline in a letter dated 20–31 December 1831 (Burkhardt & Smith, 1985*b*: 188), although it was not received by him until 5 April 1832 in Rio de Janeiro:

> I find Mr Bruce's brother has been almost as great a traveller as you are going to be—having passed seven years in Arabia, Egypt, Nubia &c these Bruces are related to *the Bruce* which I did not know before. Mr Bruce asked a great many particulars about you & begged I would tell you what happened

[1] Actual title 'Diary of observations on zoology of the places visited during the voyage'.

> to his brother who after 5 years travelling, & collecting & writing, was shipwrecked & all his papers destroyed & who never ceased regretting that he had not kept duplicates and sent off his journals & papers by every safe opportunity—he hoped you would profit by the hint.

'Mr Bruce's brother' presumably is James Bruce (1730–94), explorer of the Nile; '*the Bruce*' is Robert the Bruce (1274–1329), King of Scotland.

Advice on the keeping of good records was also offered Darwin by his cousin William Darwin Fox (1805–80), who had been a fellow student at Christ's College, Cambridge and one of his early instructors in entomology. Fox wrote on 30 June 1832 (Burkhardt & Smith, 1985*b*: 244–245):

> I have often regretted one trait of your Character which will I fear prevent your making so great an advantage you might do from your present travels, and which I regret also very much on my own account, as I might perhaps get the perusal of it;—I allude to your great dislike to writing & keeping a daily methodical account of passing events, which I fear (tho' I have also hopes the other way from the overwhelming influence of every surrounding object) will prevent you from keeping a Regular Journal.—If you do not do this, the vast crowd of Novelty which will surround you, will so jostle about ideas, that to say nothing of the many that will be lost altogether, the vivid reality & life which a memorandum taken at the moment give to every passing event & thing is done away with.—With this one exception (which I dare say you have overcome) I know of no one so fitted altogether for the expedition you are engaged in.

Darwin received Fox's letter in Montevideo, Uruguay in late October 1832. Neither it nor Caroline Darwin's of 20–31 December 1831 were published before their appearance in Burkhardt & Smith (1985*b*). Since both letters arrived in Darwin's hands several months after he had started on the voyage and begun the various series of notes, however, they probably served more as a stimulus for, rather than a commencement of, serious notekeeping. Nevertheless, scholars should be grateful to Darwin's sister and his cousin for having offered him this advice.

The present paper is divided into three parts, each of which discusses a different group of plants. As the reader will see, however, there is a certain amount of overlap between these parts. A broad definition of plants also is used, algae, fungi, lichens, and cyanobacteria being so classed, as they were by Darwin and his contemporaries.

The first part discusses the plants listed in Darwin's *Plant Notes*, prepared for Henslow, who was to identify the dried specimens. These are mostly vascular plants, ferns and flowering plants. The second part enumerates the algae, particularly the corallines, in which Darwin was keenly interested. Notes on the corallines were prepared by Darwin for the Irish botanist William Henry Harvey. The third part discusses the plants preserved in spirits; the majority of these are fungi. There is abundant evidence that a list of plants in spirits of wine was prepared, but it has not been found in spite of much searching.

For those who are surprised that Charles Darwin was such an assiduous and careful collector and recorder of specimens and observations while on the *Beagle* voyage, we need turn no further than the last sentence in his *Diary* entry for 5 March 1832, written soon after he arrived in Bahia, Brazil:

> It is a new & pleasant thing for me to be conscious that naturalizing is doing my duty, & that if I neglected that duty I should at same time neglect what has for some years given me so much pleasure.'

The Plant Notes

During the latter part of the *Beagle*'s voyage, Darwin and his servant Syms Covington (1816?–61) compiled a series of lists of collections of the various groups of organisms gathered by Darwin. The disposition of these lists and the collections they describe are discussed in Porter (1985). Sulloway (1982, 1983) has elegantly worked out that the lists were compiled between 18 June and 12 August 1836, while the *Beagle* sailed between the Cape of Good Hope and Pernambuco, Brazil. The lists were intended for the use of the taxonomists who were expected to identify the specimens included. Darwin marked the *Specimen Notebooks*' original inked entries with pencilled notations: A (mammal), B (bird), I (insect), S (shell), and P (plant) for the dried specimens and those in spirits; R (reptile or amphibian), C (crustacean), and F (fish) were added to the specimens in spirits. Theoretically, then, there should be 13 lists; all have been found except for plants in spirits and crustacea in spirits. There are several other lists for specialists that were compiled by Darwin after his return to England. That on the coralline algae is discussed in the next section of this paper.

Occasionally, Darwin added a pencilled 'Copy' or a reference to a page in the *Zoological Diary*. The latter referred to a longer discussion of the collection than was possible to give in the *Specimen Notebooks*. Usually, but not always, this was added to the information from the *Specimen Notebooks* in compiling the lists. Covington did most of this compilation, but several lists are all or mostly in Darwin's hand. Darwin also commonly corrected Covington's misspellings in the lists.

All of the known lists are deposited either in the Darwin Archives of the Cambridge University Library, or in the General Library and Entomology Library of the British Museum (Natural History). With one exception, these lists have been known for some time, although their purpose was only recently recognized. The exception is the *Plant Notes*, found in the archives of the Cambridge University Herbarium in 1980 (Porter, 1981, 1982).

In early December 1980, Mrs Rita I'Ons, then an Assistant in the Herbarium, brought to my attention two notebooks that Henslow had compiled on Darwin's *Beagle* plant collections. They were in a folder marked 'Darwin—2 Books of Lists of S. American Plants'. One notebook was titled 'C. Darwin's Plants from S. America', the other 'Darwin and Henslows S. American Plants'. Lieutenant George Henslow (dates unknown), J. S. Henslow's nephew, collected plants in South America in 1827–28. This notebook compares his and Darwin's specimens, and those of Hugh Cuming (1791–1865), with species reported from South America and the South Pacific by Hooker and Arnott (1833). This series of papers ran through 1841, and all species enumerated are included in the 37 pages of the notebook. However, Darwin's collections are noted only on the first four pages.

Tied with string in the back of the second notebook were Darwin's *Plant Notes*. In fact, the grey paper cover of the notebook is identical to the covers that remain on several of the other lists. Darwin has written '—Plants—' on the outside cover, as he did the names of the organisms on the extant covers of the other lists. Thus, Henslow's notes have been inserted into Darwin's covers, and not vice versa.

Inside the front cover of the notebook Darwin wrote:

Red = 1000
Green = 2000
Yellow = 3000

This is a note to the user that a specimen with a yellow label bearing the number 645 is actually

number 3645. This notation, or a similar one, is on the inside front cover of the other Darwin lists still retaining the original grey paper covers. Below the above Darwin added:

(980)
2377
1346 Curious Cryptogamic Plants.—
1590
2056
Name of filam Lichen at Galapagos

As was true for the other lists, these were specimens the names of which Darwin wanted so that they could be included in his *Journal of Researches* (Darwin, 1839, 1845).

Some of the dried plant, algal, or fungal specimens Darwin collected are not included in the *Plant Notes*, probably because they did not survive to be sent to Henslow, or they did not survive the trip back to England. An example of the latter is a collection of the mold *Mucor* (Mucoraceae), of which Henslow wrote to Darwin on 21 January 1833:

> 'For goodness sake what is No. 223 it looks like the remains of an electric explosion, a mere mass of soot—something very curious I daresay—' (Burkhardt & Smith, 1985*b*: 294).

Of this collection, Darwin wrote in the *Zoological Diary* (page 20):

> 1832 February St. Jago [São Tiago, Cape Verde Islands] to Fernando Noronha [Brazil]
>
> ['*Mucor*' in margin] *Mucor*. Linn: growing on a lime [i.e., *Citrus aurantifolia* (Christm.) Swingle, Rutaceae] from St. Jago length .1 of inch ['(a)' in margin] brown colour: pedicel hollow. simple transparent. diameter ·006. [i.e., inches]—at extremity ball containing sporules. diameter ·007.—Sporules varying in size. very minute. about ·0009 in diam: When the mould was placed in water. the balls burst longitudinally. & sent forth the sporules.—at same time globules of air passed down the pedicel.—This took place with such violence. that the recoil on the ball. gave it sufficient motion to be visible to the naked eye.—The same results occurred with greater force. when Spirits of Wine was used instead of water.—Was it not a similar observation. that first led Dutrochet to the discovery of the laws of Endosme?

Henri Dutrochet (1776–1847), a French scientist, in the 1820s had published on the phenomenon of endosmosis, osmotic movement into cells. Note (a) is given on page 19, *verso*:

> (a) No. 223 not in Spirits
> (a) Observed the same species growing on gum dissolved in vinegar.—(March 23) found a sort very like this on old paste; the colour was yellow, & the stalks rather longer in proportion were the only differences I could perceive

This latter collection is noted on page 29 of the *Zoological Diary*:

> ['March 23d' in margin] *Mucor* growing on green ginger [presumably *Zingiber officinale* Rosc., Zingiberaceae]: colour yellow ['Mucor' in margin] length from 1/20 to 1/15 of an inch.—Diameter of stalk ·001, of ball at extremity ·006.—Stalk transparent, cylindrical for about 1/10 of length, near to ball, it is flattened. angular & rather broader: Terminal spherule full of grains, .0001 in diameter & sticking together in planes; When placed in water the ball partially burst & sent forth with granules large bubbles of air.—A rush of fluid was visible in the stalk or cylinder.—If merely breathed on, the spherule ['was' marked out] expanded itself & three conical semitransparent projections were formed on surface—; (Much in the same manner as is seen in Pollen) These cones in a short time visibly were contracted & drawn within the spherule.—

The page is crossed in pencil and 'Copied' is noted opposite the next entry. The *Beagle* was at sea on 23 March 1832, between the island of Fernando Noronha and Bahia, Brazil. The ginger on which this mold was growing presumably had come aboard the ship at an earlier stop, probably in the Cape Verde Islands.

Later in the *Zoological Diary*, there is another entry for a fungus not included in the *Plant Notes* (page 190):

> 1833 ['May' marked out] June Maldonado [Uruguay]
> . . . . . .
> ['*Lycoperdium* 664' in margin] This curious fungus. consists of a dark brown bag. containing powder, like a common Lycoperdium: but instead of growing on the ground. it is seated on a circular flat disk (of a lighter colour) the superior & inferior edges of which are cracked & crushed.—They would seem like sphere burst through, especially the lower one: which latter is slightly attached to the soil.—Grow in damp & rather shady places:—

This collection was cited by Berkeley (1842: 447) as '*Geaster saccatus*, Fr. Darw. No. 664. 1493. Damp, rather shady places. Maldonado. June 1832.' There is a specimen at Kew filed under this name; the correct year is 1833. Darwin's entry for this member of the Geastraceae (*Geastrum saccatum* Fr.) Has 'Copied' written in pencil in the margin by Covington. This, along with Berkeley's notation of its habitat, indicates that there may have been a separate list of fungi prepared for Berkeley and sent to him with the specimens. This list would be analogous to the *Plant List* and the other lists discussed above.

Another list that has not surfaced is that prepared for Henslow of the Cocos-Keeling Islands plants. Many of those enumerated in Henslow's (1838) paper on Darwin's collections have comments on them attributed to Darwin. For example, in his discussion of *Ochrosia parviflora* (Forst. f.) Hemsl. (= *Neisiopsperma oppositifolia* (Lam.) Fosberg & Sachet, Apocynaceae; see number 3596 below), Henslow wrote that:

> 'Mr. Darwin's specimens were accompanied by the following note: "Forms straight handsome trees, with smooth bark, which are commonly dispersed two or three together. The fruit is bright green, like that of the walnut." ' (Henslow, 1838: 345).

This information is not in the *Plant Notes* or the *Zoological Diary*, leading me to conclude that it must have been in a separate list, probably prepared after the *Beagle* returned to England, like that for the coralline algae discussed in the following section.

The 11 pages of the *Plant Notes* are in Covington's handwriting, with a number of additions and corrections by Darwin. Henslow also made several additions when he was identifying Darwin's collections after the latter returned to England in October 1836. In addition, there are two names on the last page added by Joseph Dalton Hooker (1817–1911, then Assistant at the Royal Botanic Gardens, Kew) in the early 1840s when he was identifying Darwin's Galápagos Islands plants. These additions and corrections are noted below.

In the following account, the *Plant Notes* are given as written, additions and corrections included. Differences from what appears in the *Specimen Notebooks* are indicated. Sections from the *Diary* or the *Zoological Diary* are added where pertinent, as are my own comments. Scientific names and families are given for the specimens that I have identified; those that have been discussed in the literature are indicated, and the names ascribed to them given. All the vascular plants Darwin collected on the *Beagle* voyage are discussed in detail elsewhere (Porter, 1986). Specimens that I have found are indicated, and the herbaria in which they were found are given. The standard herbarium abbreviations (Holmgren *et al.*, 1983) are used: BM (British Museum (Natural History)). CGE (Cambridge University Herbarium), E-GL (Glasgow University Herbarium specimens at the Royal Botanic Garden, Edinburgh), FI-W (Webb Herbarium of the University of Florence), GL (Glasgow University Herbarium), K (Royal Botanic Gardens, Kew), and MANCH (University Museum, University of Manchester).

The *Plant Notes*

[page] (1

1832. Plants.

196. Fruit from the great Adansonia. N.E. of Porto-Praya ['St. Jago.—' added by Darwin]

Adansonia digitata L. (Bombacaceae); I found no specimens of this tropical tree.
This impressive tree caught Darwin's eye, and he commented on it several times in his *Diary* (Barlow, 1933). The *Beagle* visited São Tiago, Cape Verde Islands during 16 January–8 February 1832 and 31 August–4 September 1836. Darwin's *Diary* entry for 20 January 1832 begins:

I took a long walk with Maccormick into the interior. Although in such a country the objects of interest are few, yet perhaps from this very reason, each individual one strikes the imagination the more. We followed one of the broard water courses, which serves as a road for the country people; by the greatest good luck it lead us to the celebrated Baobob trees. I had forgotten its existence, but the sight immediately recalled a description of it which I had formerly read. This enormous tree, measured 36 feet 2 inches at the height of 2 feet 8 in. from ground. Its altitude in no way corresponds with its great thickness. I should not suppose it was 30 feet high. This tree is supposed to be one of the longest lived that exists. Adanson supposed that some reached to the age of 6,000 years. This one bears on its bark the signs of its notoriety; it is as completely covered with initials & dates, as any one in Kensington Gardens.

Dr Robert MacCormick (1800–90) was Surgeon on the *Beagle* until Rio de Janeiro, Brazil was reached in April 1832. MacCormick was sent back to England because of personality problems with Captain Robert FitzRoy (1805–65) and John Clements Wickham (1798–1864), First Lieutenant. Michel Andanson (1727–1806), for whom Linnaeus named the genus *Adansonia*, was a French botanist and explorer.
In his *Diary* entry for 24 January, Darwin added:

After our one o'clock dinner, Wickham, the Captain & myself walked to the famous Baobob tree & measured it more accurately. Cap. FitzRoy first took an angle by a pocket sextant & afterward climbed the tree & let down a string, both ways gave the same result, viz. 45 feet in height. Its circumference measured 2 feet from the ground (there being no projecting roots) gave 35. Its form is oval, & its greatest visible diameter was 13 feet. So that in an accurate drawing its height would be 3·4 of its breadth. Cap. FitzRoy made a sketch, which gave a good idea of its proportion, yet in this the height was only about 2·4 of [its] breadth. Proving, what one so often observes, that a faithful delineation of nature does not give an accurate idea of it. We returned home after our merry & pleasant walk, just as it was dark.

The *Beagle* returned to Porto Praia in early September 1836, a month before her return to England. Darwin returned to the subject of the Baobab in his *Diary*:

Our old friend the great Baobab tree, was clothed with a thick green foliage, which much altered its appearance. As might be expected, I was not so much delighted with St Jago as during our former visit: but even this time I found much in its Natural History very interesting.

'St Jago' is Darwin's version of São Tiago.

200. 2 sorts of Fucus. ['V. 14. (b).' marked out by Darwin.]

Presumably, species of brown algae, Phaeophyta; I found no such specimens. 'V. 14. (b).' is a note to see Note b on page 14 of the *Zoological Diary*. The relevant part of page 14 reads:

1832 Feb: St. Jago
['(b)' in margin, referring to Note b, given below.] *Bacillariées* (Dic. Class:) growing on Jania. Vide ['Bacillariées' in margin] Pl. 3. Fig. 2.—drawn 200 times natural size.—Fig. 3.—on a Fucus: Fig. 4. in the sea invisible to naked eye.

This and to the top of the page has been marked out. Page 13 *verso* reads '(b) . . . *200* not spirits. *Fucus*'. That is, number 200 is a dried specimen of *Fucus*. '*Bacillariées*' are diatoms, Chrysophyta; 'Dic. Class.' is a reference to the *Dictionnaire Classique d'Histoire Naturelle* (17 volumes, 1822–31), a copy of which was on the *Beagle* and which proved quite useful to Darwin in his studies of marine organisms; and 'Jania' is a genus of coralline algae, Rhodophyta. The latter are discussed in the following sections of this paper. The references to figures and plates are to Darwin's drawings, which accompany the *Zoological Diary*.

269. The commonest tree in the island [i.e., São Tiago], growing in the valleys; the juice abounds with gallic acid making all things directly black.

I found no specimen with this number. Gallic acid is a widespread compound in plants, and this could be one of a number of tree species. I found no mention of this plant in either Darwin's *Diary* or in any of his *Beagle* notebooks. There is a pencilled cross in the margin next to this entry, which refers to a query regarding the name of the plant. While he was writing his *Journal of Researches* (Darwin, 1839), Darwin wrote to Henslow in May 1837 (Barlow, 1967: 128):

There are ['one *del*' added by Barlow] about half a dozen plants of which if I do not know the names of genus or something about them, I must strike out long passages in my journal.—Will you have the kindness to tell me, a week or ten days before you leave Cambridge; so that those questions which are most indispensable to me, perhaps you would not grudge one day in answering.—This in case I publish before autumn, otherwise when you return will be soon enough for me.

Presumably the crosses were added by Darwin before the *Plant Notes* were sent to Henslow, although they might have been added later by Darwin or Henslow himself. Unfortunately for Darwin, Henslow never was able to answer his queries, and the first edition of the *Journal of Researches* contains much less botanical information than Darwin wished (Porter, 1980*a*).

['NB.' added in the margin by Darwin] The following plants [numbers 270–303] collected at St. Jago ['Cape de Verd. Islands' added by Darwin] from Jan y. 16th to Feb. 8. [lines added around numbers 270–303]

270. Near stream at St. Domingo. ['a little town in St. Jago' added by Darwin; 'N°. 412 of JSH' added by Henslow]

Christella dentata (Forsk.) Brownsey & Jermy, (Polypodiceae); specimen at CGE.
Darwin visited São Domingos on 2 February 1832. He wrote in his *Diary*:

As the road approaches the sides of the hill or precipice, the town & valley of St Domingo are seen. I can imagine no contrast more striking than that of its bright vegetation against the black precipices that surround it. A clear brook gives a luxuriance to the spot that no other part of the island would lead you to expect. Nothing has surprised me so much as the very dark green of the oranges; some tropical forms can easily be imagined either from hot-house specimens or from drawings, such as Bananas; but I do not think any adequate idea of the beauty of Oranges or Cocoa Nut trees can be formed without actually seeing them on their own proper soil. . . . We were told there was a lake about 2 miles from St Domingo: after dinner we started to see, & followed a path by the side of a brook: on each side were flourishing Bannanas, Sugar Cane, Coffee, Guavas, Cocoa Nuts & numberless wild flowers. None can conceive such delight but those who, fond of Natural history, have seen such scenes.

This fern and numbers 276, 277, 280, and 281 below probably were collected on this part of his journey from Porto Praia to São Domingos and return.

271. 272. Plants.

No collections bearing these numbers were found.

273. Ribera. Grande.

This collection was not found.
In his *Diary*, Darwin describes a visit to the town of Ribeira Grande on 26 January 1832:

> The road to Ribeira for the first six miles is totally uninteresting & till we arrived at the valley of St Martin the country presented its usual dull brown appearance: here our eyes were refreshed by the varied & beautiful forms of the tropical trees. The valley owes its fertility to a small stream & following its course Papaw trees, Bananas & Sugar cane flourished. I here got a rich harvest of flowers, & a still richer one of fresh water shells.

His entire entry for the 27th is, 'Employed in working at yesterday's produce.'

274. 275. Plants.

Both are *Chenopodium murale* L. (Chenopodiaceae); specimens at CGE.

276. 277. Water cress and other plants from St Domingo.

'276. Achyranthes argentea. JH)' added by Henslow
Number 276 is *Ocimum americanum* L. (Lamiaceae). The number also (according to Henslow's notation) was given to *Achyranthes aspera* var. *pubescens* (Moq.) C. C. Townsend or *A. aspera* var. *sicula* L. (Amaranthaceae). Number 277 is *Equisetum ramosissimum* Desf. (Equisetaceae). All specimens are at CGE. No collections of watercress, presumably *Nasturtium officinale* R. Br. (Apiaceae), were found.
Ocimum americanum, a tropical American species, is sometimes cultivated as basil (*Ocimum basilicum* L.)

278. 279. Plants.

Number 278 was not found. Number 279 is the type of *Campanula jacobaea* C. Sm. ex Webb (Campanulaceae); specimens at CGE and K.

280. St. Domingo, damp, place.

Tagetes patula L. (Asteraceae); specimens at CGE, FI-W, and K.
This ornamental native of Mexico, the French marigold, is naturalized in many parts of the world.

281. D°. [i.e., ditto: 'St. Domingo, damp, place']

'410 of J. H. Adiantum Capillus', apparently added by Hooker
Adiantum capillus-veneris L. (Adiantaceae); specimens at CGE, GL and FI-W.

282. St. Jago. ['(Achyranthes argentea JH)' added by Henslow]

Achyranthes aspera var. *pubescens* (Moq.) C. C. Townsend or *A. aspera* var. *sicula* L. (Amaranthaceae); specimens at CGE.
One herbarium sheet at Cambridge bears a mixed collection of these two varieties; one specimen presumably is number 282, the other number 276.

283. Dry places.

No specimen with this number was found.

284. St. Martin.

No specimen with this number was found.
In his *Diary*, Darwin recorded being in 'the valley of St. Martin' (São Martinho) on 26 January 1832. See the entry for number 273 above.

285. Plant.

No specimen with this number was found.

286. The two lowest ['(in the Page)' added by Darwin] plants are the commonest on desert places. The bush smells sweet.

No collections bearing this number were found. The addition 'in the Page' refers to the entry in the *Specimen Notebook*.

287. 288. Plants.

Both numbers are types of *Dalechampia senegalensis* Juss. ex Webb (Euphorbiaceae); specimens at CGE.

289. Quail Island.

No specimen with this number was found.
Darwin records visiting Quail Island, Ilhéu de Santa Maria, near Porto Praia, on 17, 18, 22, 25, and 30 January 1832. He mentions geologizing and the collection of marine animals, but does not mention the plants seen or collected thereon.

290. 291. D°. [i.e., 'Quail Island']

Number 290 was not found, but 291 is *Asteriscus vogelii* (Webb) Walpers (Asteraceae), and is the type of *Odontospermum vogelii* var. *darwinii* Webb, a synonym; specimens at CGE and K.

292. Plant with stalks. on rocks near sea.

No collection with this number was found.

293. 294. St. Domingo.

No collections bearing these numbers were found.

295. 296. 297. 298. 299. 300. St. Martin.

Numbers 296, 298, and 299 were not found. Numbers 295 and 297 are *Potamogeton pusillus* L. (Potamogetonaceae); specimens at CGE and FI-W. Number 300 is *Argemone mexicana* L. (Papaveraceae); specimen at CGE.
The *Potamogeton* presumably was collected in the stream mentioned by Darwin in the valley of São Martinho cited under number 273 above. The prickly poppy is a weed introduced from the Americas.

301. 302. 303. St. Jago.

Number 303 was not found. Number 301 is *Melhania ovata* (L.) Spreng. (Sterculiaceae); specimen at CGE. Number 303 is *Datura metel* L. (Solanaceae); specimen at FI-W.

309. Lichen, from the highest peak of Fernando Noronha.

Number 309 was not found. However, Berkeley (1842: 445) cited '*Cora pavonia*., Fr., Darw. No. 347. Highest peak of Fernando Noronha.' (i.e., *C. pavonia* (Web.) Fr.). Berkeley (or someone else) must have mistakenly labelled this *Cora* (Thelephoraceae) 347, which is the next number in the *Plant Notes*.
In describing this island off the coast of Brazil, Darwin wrote in his *Diary* for 20 February 1832:

I spent a most delightful day in wandering about the woods. The whole island is one forest, & this is so thickly interwined that it requires great exertion to crawl along. The scenery was very beautiful, & large Magnolias & Laurels & trees covered with delicate flowers ought to have satisfied me. But I am sure all the grandeur of the Tropics has not yet been seen by me. We had no gaudy birds, no humming birds, no large flowers: I am glad that I have seen these islands. I shall enjoy the greater wonders all the more from having a guess what to look for. All the trees either bearing some fruit or large flower is perhaps one of the most striking things that meet one whilst wandering in a wood in these glorious regions.

Unfortunately, he collected only a few of these plants that he described.

347. Fuci. D°. [i.e., 'Fernando Noronha']

Presumably, a brown alga, Phaeophyta; no such collection was found.

384. A leafless tree bearing beautiful pink flowers.

[page] (2

1832. Plants.

at Fernando Noronha, an essential character in landscapes.

Tabebuia roseo-alba (Ridley) Sandwith (Bignoniaceae); specimen at CGE.
This certainly is the 'trees covered with delicate flowers' referred to by Darwin in his *Diary* entry for 20 February 1832, quoted above under number 309.

392. Conferra. [i.e., 'Conferva' misspelled by Covington] V ['P.' added by Darwin] 32. March.

'Conferva' is a filamentous alga; no such specimen was found.
'V P. 32' is a note to see page 32 of the *Zoological Diary*. This page is headed, '1832 March Ar[changed from l]bolhos Shoals' (i.e., Arquipelago de los Abrolhos, Bahia province, Brazil). The relevant section reads:

['*Conferva*' in margin] On 28th, 10 miles West of Abrolhos; there came up with the lead (17 fathoms) a piece of Fucus.—on which were growing numerous minute. tufts on a Conferva ['32 not spirits' in margin].—Stems simple cylindrical white transparent jointed: end truncate; length 1/10 of inch. diameter 2/3000.—on this minute

[page] 33

1832 March Abrolhos Islands

['*Conferva*' and (b) in margin] plant & on a small coralline were crowded together a forest of numerous species of Bacillareès. & Anthrodieès.

A pencilled line is drawn through page 32, and the lines on page 33 are marked out by pencilled lines. Note b on page 32, *verso* is '(b) 393. not spirits'; it refers to the 'small coralline', presumably a coralline alga, Rhodophyta. 'Bacillareès' are diatoms, Chrysophyta; 'Anthrodieès' are coelenterates.
Page 34 of the *Zoological Diary* has an entry on the vegetation of the islands:

1832 ['Abrolhos Islands *Gen: observ:*' in margin] The Abrolhos islands seen from a short distance are of a bright green colour.—The vegetation consists of succulent plants & gramina, interspersed with few bushes & Cactuses.—['(b)' in margin].

Note b on p. 33 *verso* reads:

(b) Small as my collection of plants is from the Abrolhos. I think it contains nearly every species then flowering.—

Darwin repeated this last comment in a letter to Henslow of 15 August 1832 from Montevideo, Uruguay.

463. Lichens. Mosses &c on trees chiefly oranges, old trees. May. Rio de Janeiro. [Above this is a line across the page with 'Rio de Janeiro' under it on the upper right added by Darwin.]

No lichens or mosses with this number were found, but two fungi bearing this number were cited by Berkeley (1842): '*Schizophyllum commune*, Fr., Darw. No. 463. On orange-trees. Rio Janeiro. May.' (p. 444; Schizophyllaceae), and '*Radulum palmatum*, n.s. . . . Darw. No. 463. On orange-trees. Rio Janeiro. May.' (p. 445; Hydnaceae; specimen at K). No specimens of the *Schizophyllum* were found.

464. Lichens. D°. [i.e., 'Rio de Janeiro']

No lichens with this number were found. However, Berkeley (1839: 291) listed '*Polyporus sanguineus*, Mayer (No. 464). Rio Janeiro. May.' The correct name for this fungus is *Pycroporus sanguineus* (L. ex Fr.) Murr. (Miller & Farr, 1975). It is a member of the Polyporaceae.
On p. 39 *verso* of the *Zoological Diary*, Darwin made the following entry:

On May 5th & 17th there was a good instance of an appearance, which I had frequently witnessed with surprise on the Rio Macaè.—In ['both' marked out] all cases for some hours the country had been drenched with rain; as soon it ceased a most extraordinary evaporation commenced.—At 100 feet elevation the wooded hills were almost hidden in the clouds of vapour, which rising like columns of smoke from beds ['of' marked out] not to be distinguished from the surrounding Cumili.—The most thickly wooded parts produced the greatest quantity.—I suppose this fact is owing to the great surface ['extent' marked out] of heated foliage.—The atmosphere itself was not very damp DP [i.e., dew point] 71. Temp 78. Diff: 7

Darwin made his trip to the Rio Macaé, in the province of Rio de Janeiro, between 8 and 24 April 1832.

575. Cryptogam['ou' added by Darwin]s plant, like a hollow horse hair on a dead tree in the forest. June. R. de Janeiro

No specimen with this number was found. However, Berkeley (1839: 293) listed: 'Two other species are in the same collection [i.e., Darwin's] which I am unable to determine . . . the other an important *Thamnomyces* (Probably *T. chordalis*) from Rio Janeiro, No. 575.'

581. Feon, [i.e., 'Fern', misspelled by Covington] hanging from tree. D° [i.e., Rio de Janeiro]

Asplenium mucronatum K. Presl. (Aspleniaceae); specimen at CGE.
On page 41 of the *Zoological Diary*, Darwin has entered some information on temperature extremes he has observed:

1832 June Rio de Janeiro

['*Meteroloy*:'. i.e., 'Meteorology' in margin] The thermometer (at same time) exposed on white cotton to the sun was at 2 PM 115°.—The night was cloudless & a copious dew was falling. Therm on the open turf fell to 61°.— So that the vegetation even in the winter season undergoes a range of 54 degrees.—

582. 583. Leaves and flowers of Palm tree. D°. [i.e., 'Rio de Janeiro']

Geonoma schottiana Mart. (Arecaceae); specimens at CGE.

584. Stem of D°. [i.e., 'Palm tree'] True height 9 feet; circumference at bottom 3 1/3 inches; at top 2 2/3. On the trunk there were 305 rings. Do these mark the year? shaded forest on hill.

Geonoma schottiana Mart. (Arecaceae); I did not find this specimen.
Darwin's *Diary* for 18 June 1832 includes the following entry:

King came & spent the day with me; we both on horseback started for the old forest. He shot some birds & as is generally the case I found many interesting animals of the lower classes. We found a little Palm tree, only a few inches in circumference, which I believe to be 305 years old. I judge of this from its number of rings, each of which I imagine marks a year.

These 'rings' however, were leaf scars, formed when a leaf dehisces and drops from the stem. This happens far more than once a year. 'King' was Philip Gidley King (1817–1904), Midshipman on the *Beagle*.
Darwin noted in the *Zoological Diary*, p. 64:

1832 April: May: June Rio de Janeiro
. . . . . .

['General *observ*:' in margin] Whilst I ascended the Concorvado.— I measured some of the trees; the circumference.

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1832 April: May: June Rio de Janeiro

['General Observations' in margin] of the greater number of trees. as in the interior is not more than from 3 to 4 feet.—I only saw one 7ft & another the largest 9ft & 7 inches.—One of those remarkable trees. which have plates [i.e., buttresses] running running from the roots up the trunk. had an apparent diameter of 7ft 3 inch—One of the plates projected a mean distance of 3 feet & was not above 2 or 3 inches thick.—This fact has been noticed by all travellers.—I could not help noticing how exactly the animals & plants in each region are adapted to each other.—Every one must have noticed how Lettuces & Cabbages. suffer from the attackes of Caterpillars & Snails.—But when transplanted here in a foreign clime. the leaves remain as entire. as if they contained poison.—Nature. when she formed these animals & these plants knew they must reside together.—

In his *Diary*, Darwin records ascending the Corcovado, a 704 m. high mountain immediately west of Botafogo, on 25 and 30 May 1832. He measured its height as 2,225 feet on the latter day, during which he also made the measurements of trees given above.

585. Cryptogam['ous' added by Darwin]; Cascade Tijenka [changed by Darwin from Covington's 'Tjenka']

Selaginella jungermannioides (Gaud.) Spring (Selaginellaceae); specimens at CGE.
The *Diary* entry for 16 June 1832 is:

Started early in the morning of Tijeuka to see the waterfalls. Neither the height or the body of water is anything very imposing; but they are rendered beautiful by the dampness so increasing the vegetation, that the water appears to flow out of one forest & to be received & hidden in another below. On the road the scenery was very beautiful; especially the distant view of Rio. As a Sultan in a Seraglio I am becoming quite hardened to beauty. It is wearisome to be in a fresh rapture at every turn of the road. And as I have before said, you must be that or nothing.

The Pico de Tijuca and Rio Tijuca are in the province of Guanabara, several miles west of Darwin's base in Botafogo.

586. 587. 588. Cryptogam['ou' added by Darwin]s; plants on Cancovado, about 2000 feet

above the sea; Cloud['e' marked out by Darwin]s generally resting on it, the dampness produces innumerable Cryptogam['ou' added by Darwin]s plants. These were procured. May 30th

No specimens bearing these numbers were found.

589. Tea, tree. Botanic Garden.

Camellia sinensis (L.) O. Kuntze (Theaceae); specimen at CGE
Darwin recorded a visit to the Rio de Janeiro botanic garden on 27 May 1832:

Walked to the Botanic Garden; this name must be given more out of courtesy than anything else; for it really is solely a place of amusement. The chief & great interest it possesses, is the cultivation of many plants which are notorious from their utility. There are some acres covered with the Tea tree. I felt quite disappointed at seeing an insignificant little bush with white flowers & planted in straight rows. Some leaves being put into boiling water, the infusion scarcely possessed the proper tea flavour.

Descriptions of other plants that he saw follow, but this appears to be the only one he collected.

590. Cryptogam['ou' added by Darwin]s; plant. Cancovado.

I found no specimen with this number. There are several unidentified mosses at CGE labelled 'Rio Janeiro, June 1832 S. America, *C. Darwin*', but none are numbered.

591. D°. [i.e., 'Cryptogamous; plant. Cancovado.'] growing in numbers on the old trees, on arid planes, near the sea, giving a most fantastic appearance to them.

No specimen bearing this number was found.

596. 597. 598. 599. 600. Cryptogamus; plants, chiefly on rotten trees, in forest. June.

Number 598 was not found, but the others all are fungi. A specimen was found only for number 599, the others were cited in papers by Berkeley (1839, 1842). Number 596 was cited by Berkeley (1842: 447) as '*Sphaeria polymorpha*, Pers. . . . On rotten trees in forest. Rio Janeiro. May.' This is now *Xylaria polymorpha* (Fr.) Grev. (Xylariaceae).
Numbers 597, 599, and 600 were cited by Berkeley (1839) as 'Rio Janeiro. June'. Number 597 is '*Polyporus sanguineus*, Meyer', cited as 'Polyporus sanguineus, Fr.' by Berkeley (1842); according to Miller & Farr (1975), the correct name for the taxon is *Pycnoporus sanguineus* (L. ex Fr.) Murr. (Polyporaceae). Number 599 was given to two collections: '*Polyporus pinisitus*, Fr.' (specimen at K), according to Miller & Farr (1975) the correct name is *Coriolus pinisitus* (Fr.) Pat. (Polyporaceae); and '*Thelyphora lobata*, Kz.', according to Corner (1968), the correct name is *Stereum lobatum* (Kze.) Fr. (Stereaceae). Number 600 is '*Polyporus australis*, Fr.', *Fomes australis* Fr. (Polyporaceae). Berkeley (1839: 291) cited *Stilbum lateritum* Berkeley as 'With the last.' (i.e., *Polyporus sanguinius*), type at K (Phleogonaceae).

686. Lichen, growing on stones near summit of Mount. The Mount is 450 feet high.

Usnea densirostra Taylor (Usneaceae). This type specimen is at BM.
On 28 July 1832, Darwin recorded in his *Diary* his first visit to this locality in Uruguay:

Landed early in the morning on the Mount. This little hill is about 450 feet high & being by far the most elevated land in the country gives the name Monte Video. The view from the summit is one of the most uninteresting I ever beheld. Not a tree or a house, or trace of cultivation give cheerfulness to the scene. An undulating green plain & large herds of cattle has not even the charm of novelty. Whoever has seen Cambridgeshire, if in his mind he changes arable into pasture ground & roots out every tree, may say he has seen Monte Video. Although this is true, yet there is a charm in the unconfined feeling of

walking over the boundless turf plain. Moreover if your view is limited to a small space, many objects possess great beauty; some of the smallest birds are more brilliantly coloured, much more so than those in Brazil. The bright green turf being browsed short by the cattle, is ornamented by dwarf flowers; amongst which to my eyes the Daisy claimed the place of an old friend. The only other plants of larger size are tall rushes & a thistle, resembling much the Acanthus; the latter with its silvery foliage covers large spaces of ground.

In spite of these descriptions of flowering plants, I found no such specimens that Darwin collected in Montevideo. He also wrote of collecting on 'The Mount' on 20 November, but mentions only lizards, not plants.

761. Succulent plant; covering large tracts of pampas, and looking at a distance like our heaths; grows chiefly in salt plains overflowed occasionally by the sea. Septr. B. Blanco.

Allenrolfea patagonica (Moq.) O. Kuntze (Chenopodiaceae), type specimens at CGE and K. This entry is marked with a pencilled cross in the margin by Darwin.
Darwin's specimens are dated 14 and 21 September on their labels. In his *Diary* entry for 14 September 1832 he wrote:

Whilst shooting, I walked several miles within the interior; the general features of the country remain the same, an undulating sandy plain, covered with coarse herbage, & which as it extends, gradually becomes more level. The bottoms of some of the vallies are green with clover; it is by cautiously crawling so as to peep into these that the game is shot.

For the 'clover', see number 791 below.
The *Diary* entry for 21 September reads: 'In the morning there was a great deal of wind; so that I did not leave the ship.' Therefore, it is doubtful that he collected on that day. The *Beagle* was at Bahía Blanca, Argentina from 5 September through 18 October 1832.

762. A very abundant grass, growing in tufts ['and' marked out by Darwin.] on sandy plains. D°. D°. [i.e., 'Septr. B. Blanco']

Poa ligularis Nees ex Steud. (Poaceae), specimen at CGE.

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1832 Plants

763. Oxalis in great numbers. B. Blanco. Flowers bright pink.

Oxalis floribunda Lehmann (Oxalidaceae), specimens at CGE and E-GL. Darwin has marked a pencilled cross in the margin of this entry.
The *Diary* entry for 11 October 1832 is:

Took a long walk in a straight line into the interior; uninteresting as the country is, we certainly see it in by far the best time. It is now the height of Spring; the birds are all laying their eggs & the flowers in full blossom. In places the ground is covered with the pink flowers of a Wood Sorrell & a wild pea, & dwarf Geranium. Even with this & a bright clear sky, the plain has a dreary & monotonous aspect.

This collection is the 'Wood Sorrell.' The 'wild pea' probably is *Lathyrus crassipes* Gill. ex Hook. & Arn. (Fabaceae), unnumbered specimens at CGE), and the 'dwarf Geranium' the *Erodium* discussed below (number 792).

764. Bush. very common; growing in tufts like our Gass [Covington's reading of Darwin's 'Grass'] banks ['NB.' added by Darwin] Septr. 23rd All these plants were in full flower. D°. [i.e., 'B. Blanco']

Discaria longispina (Hook. & Arn.) Miers (Rhamnaceae), specimens at CGE and K. There is a pencilled cross in the entry margin.
On 23 September 1832, Darwin recorded in his *Diary*:

> A large party was sent to fish in a creek about 8 miles distant; great numbers of fish were caught. I walked on to Punta Alta to look after fossils; & to my great joy, I found the head of some large animal, imbedded in a soft rock. It took me nearly three hours to get it out. As far as I am able to judge, it is allied to the Rhinoceros. I did not get it on board till some hours after it was dark.

It was the skull of *Megatherium*, an extinct ground sloth. It made a great impression on Darwin and led him to search for and collect a number of fossil vertebrates here and elsewhere on the voyage.

791. Clover, very common. This plant ['characterizes' added by Darwin] all the low, and more fertile spots; mingled with grasses and the Geranium (792) it forms a thick mass of herbage, in places nearly a yard deep; Septr. 15th to Octob. 1st. It is said the cattle ['do not eat it' added by Darwin] B. Blanco.

Melilotus indica (L.) All. (Fabaceae), specimens at CGE and K. Darwin has pencilled a cross in the margin of this entry.
This is the 'clover' referred to in the *Diary* entry for 14 September 1832 (see number 761 above).

792. Geranium, very abundant, in flower middle of Septemr D°. [i.e., 'B. Blanco']

Erodium cicutarium (L.) L'Her. (Geraniaceae), specimen at CGE. There is a pencilled cross in the margin of this entry.
This is the 'dwarf Geranium' referred to in the *Diary* entry for 11 October 1832 (see number 763 above).

793. A low Bush, common near the sea. Octobr. D°. [i.e., 'B. Blanco']

Ephedra ochreata Miers (Ephedraceae), type specimens at CGE and K. This is the only gymnosperm collected by Darwin that I have found.

794. D°. [i.e., 'A low bush'] flowers smelling sweet growing near the sea. D°. [i.e., 'Octobr.'] D°. [i.e., 'B. Blanco']

Lycium chilense Miers ex Bert. (Solanaceae), specimens at CGE.

839. Phytocalla; (a large tree) Buenos. Ayres. [This is all marked out by Darwin.]

Phytolacca dioica L. (Phytolaccaceae). I found no specimens of this species.
This is the *ombú*, mentioned in the *Diary* entry for 19 September 1833 while passing across the pampas to Buenos Aires: 'here and there the solitary Estancia [i.e., small farm], with its Ombu tree.'

924. Lichen. from very summit of Mount. M. Video.

Parmelia fistulosa Taylor (Parmeliaceae), type specimen at BM.
Darwin was back in Montevideo, Uruguay in November 1832. He records collecting on 'the Mount' on the 20th. The label of a fern specimen at K [*Casseebeera triphylla* (Lam.) Kaulf. (Simopteridaceae)] states, 'with No. 924 a Lichen'.

Tierra del Fuego. 1833. Jan y.

976. Plant, *chief origin of the* [underlining added by Darwin] peat bogs.

Astelia pumila (Forst. f.) Gaud. (Lilaceae), specimen at CGE.

['V. 155.' added by Darwin]

'V. 155.' is a note to see page 155 of the *Zoological Diary*.

['N.B.' added in margin by Darwin] At the height of above 1400 feet I found dwarf Beech trees, (about a foot high,) in sheltered corners ['(a)' in margin added by Darwin] the main line of separation between the trees and grass is perhaps 2 or 300 feet lower. Within the *Beagle* channel this line was so horizontal and wound round in the vallies in so straight a direction as to resemble the high water mark on a beach. The extreme dampness of the climate favours the course luxuriance of the vegetation; the woods are an entangled mass where the dead and ['&' in *Zoological Diary*] the living strive for mastery. Cryptogamio ['Cryptogamic' in the *Zoological Diary*] plants here find a most congenial site. Fe['rn' added by Darwin]s however are not abundant. The Fuegians inhabit the same spot for many years;

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1833. Plants. Tierra del Fuego

in one place I found 10 inches of fine vegetable mould over the layer of muscle and ['&' in *Zoological Diary*] limp['e' added by Darwin]t shells; in consequence of this, these mounds may be told at a distance by the bright green of the vegetation. ['1276' marked out by Darwin] ['amongst' in the *Zoological Diary*] The concomitant plants are mostly the wild celery ['(1076)' added by Darwin], scurvy grass, (984) (985) black currants tree; these, although not used by the Fuegians, are the most useful plants in ['(B)' added in margin by Darwin] the country and seem placed to attract attention.

The following was added by Darwin on p. 3, *verso*:

(a) It was in January in these very hills, about 1400 feet high, that, a snow storm destroyed two of M[r] Banks party and caused so much suffering to the whole of them.

He added on p. 4, *verso*:

(B) Jemmy Button said 'when leaves yellow, snow all go.'—Captain FitzRoy states that in April the leaves of the trees which grow on the lower parts of the hills turn colour; but not those high up.—I recollect having read a paper to show that in England warm Autumns hastened the falling of the leaves; that the process is a [not in *Zoological Diary*] regular part of the vegetation: This fact would seem to show the same law.

The above additions came from pages 154, 155 and 154, *verso* of the *Zoological Diary*, where they were indicated marginally as 'General *Observations*' (p. 154) and 'General *Observation* Vegetation' (p. 155). In the margin opposite each was written 'Copied' in pencil by Covington. The additional notes were on page 154, *verso* and were marginally indicated 'a' and 'B' in ink by Darwin. Opposite B was '*Not Copied*', added in ink by Covington. Number 984 is *Oxalis enneaphylla*, 985 is *Senecio acanthifolius*, and 1076 *Apium australe* (see below).
Page 155 of the *Zoological Diary* continues with a different pen:

['*Peat*' in margin] In every part of the country which I have ['1833' added in pencil in margin by Darwin] seen, the land is covered by a thick bed of peat.—It is universal on the mountains, above the limits [of] the Beech; & everywhere, excepting in the very thickest parts of the woods it abounds.—The beech often grows out of it & hence great quantities of timber must annually be imbedded.—['It flourishes' marked out] It increases most on the sides of hills & is I think of great thickness: the only section I saw varied from 6 to 12 feet. In more level sites the surface is broken up by nemberless [i.e., numberless] pools. which have an artificial appearance as if dug for the sake of peat.—These are often close to each other & yet of

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1833 Jan & Feb. Tierra del Fuego

['Peat' in margin] different levels; showing how impervious the peat is when acted on by water.—At the bottom of these shallow pools there is a great quantity of brown flocculent matter in which Conferva flourish & *very little* moss.—The great agent, which ['1075 & 976' in margin] forms the peat is a small ['p' changed to 's'] plant, with thick leaves & of a bright green colour (No^{r} 976).—['(not spirits)' in margin, marked out] The plant grows on itself; the lower leaves die. but yet remain attached to the tap root.—this latter penetrate in a living state to the depth of a foot or two.—& from the surface to the bottom the succession of leaves can be traced from their perfect state to one almost entirely disorganized.—Subterranean streams are common, these & [changed from 'by'] the ['pools of' marked out] ['stagnant' added in pencil] water. by breaking up the upper peat & ['dissolving' marked out] macerating the ['dea' marked out] rotten leaves helps to form the more compact parts.—

On page 155, *verso*, there are two notes not keyed into pages 155 and 156:

(a) The appearance of these ['woods' marked out] forests brought to my mind the artificial woods at Mount Edgecombe: the greeness of the bushes & the twisted forms of the trees, covered with Lichens, in both places are caused by strong prevalent winds & great dampness of climate.—
(b) It would be difficult to find a spade full of earth in Tierra del F. excepting in the spots, where the Fuegians have long frequented. & on the remnants of ancient alluvial formation, described in Geological notes; but even in this latter ground, is in some places, covered with peat as in Goree Sound.—

977. Parasite plant on the beach [i.e., beech] Jan-y.

Myzodendron brachystachyum DC. (Myzodendraceae), specimens at CGE and K. There is a pencilled cross in the margin of this entry.
This angiosperum parasite was collected from a tree of Antarctic beech (*Nothofagus betuloides* (Mirb.) Oerst., Fagaceae), see number 1013 below.

978. The infusion made a pleasant drink, much used by the Sealors [changed from Covington's 'Sailors' by Darwin] instead of tea; ['grows' added by Darwin] on the hills; Bea['rs' added by Darwin] a pale pink berry; with a fine sweet Juniper flavour; the plant is said by the sealers to be diuretic. Feb.

Myrteola nummularia (Poir.) Berg (Myrtaceae), specimens at CGE and K. Marked with a pencilled cross in the margin. Commented on in the *Zoological Diary*, see number 1073 below.

979. Cryptogamio; when alive partly enveloped in gelatinous matter. Feb.

No specimens bearing this number were found. The identity of this cryptogam, presumably a fungus, is unknown.

980. (same as 503. spirits) ['(a)' added by Darwin]

This is an unidentified liverwort; specimen at CGE. The following was copied by Covington from page 145 of the *Zoological Diary*, although it is not indicated as such. There it is marginally indicated, 'Cryptogamic *Plant* 503 & 980 (not spirits)' in pen by Darwin, and 'Copied' in pencil by Covington.

light brown sporule, ['a' added in margin by Darwin] diameter 1/2000 [changed from 1/4000 in *Zoological Diary*] of an inch; with these were bits of fibres, resembling necklace (each bead being about 1/4 of ['size of' added by Darwin] the sporule) I should think these acted as placenta to the sporules. Capsule opens into four longitudinal pieces, which curl backwards. When placed in Alcohol, no action but the specimens ['specimen' in

Zoological Diary] was not fresh. The immature capsula, ['capsule' in *Zoological Diary*] when first bursting from sheath, appear ['appears' in *Zoological Diary*] involved in gelatinous matter; Grow in tufts, in wet places, near a cascade, in mountainous woods. Hermit Isle. Decr. 25th.

There is a note on page 4, *verso* in Darwin's handwriting:

a In general habit resembling a moss; colour pale green, penducle of capsule transparent, ['colourless' added in *Zoological Diary*] capsule ['oval' added in *Zoological Diary*] dark brown tough containing an infinite number of globular light brown sporules & &—

981. Growing generally near the wigwams

Epilobium ciliatum Raf. (Onagraceae), specimens at CGE and K. Marked in the margin with a pencilled cross.

In his *Diary* entry for 27–29 December 1832, Darwin wrote:

In most of the coves there were wigwams; some of them had been recently inhabited. The wigwam or Fuegian house is in shape like a cock of hay, about 4 feet high & circular; it can only be the work of an hour, being merely formed of a few branches & imperfectly thatched with grass, rushes &c. As shell fish, the chief source of subsistence, are soon exhausted in any one place, there is a constant necessity for migrating; & hence it comes that these dwellings are so very miserable. It is however evident that the same spot at intervals, is frequented for a succession of years. The wigwam is generally built on a hillock of shells & bones, a large mass weighing many tuns. Wild celery, Scurvy-grass, & other plants invariably grow on this heap of manure, so that by the brighter green of the vegetation the site of a wigwam is pointed out even at a great distance.

These caves were on 'islands at the back of Hermite's.' Isla Hermite, prov. Magallanes, Chile is immediately north of Cape Horn. 'Wild celery' is *Apium australe* (Apiaceae), and 'Scurvy-grass' *Oxalis enneaphylla* (Oxalidaceae). See numbers 1076 and 984 below, and 976 above.

982. Plant very Alpine.

Senecio darwinii Hook. & Arn. (Asteraceae), type specimen of *S. darwinii* var. *laxa* Hook. & Arn. at CGE.
Darwin wrote in his Diary entry of 20 December 1832 of ascending 'some of the mountains in order to collect Alpine plants & insects.' This was in the vicinity of Bahía Buen Suceso, Terr. Tierra del Fuego, Argentina.

983. Pretty pink flower growing near to a cascade.

No collection bearing this number was found.

984. Scurvy grass (very good) growing near the wigwams ['V. 155.' marked out by Darwin]

I found no specimens bearing this number, but *Oxalis enneaphylla* Cav. (Oxalidaceae) is called 'Scurvy-grass' in the nearby Falkland Islands (Moore, 1968). This is probably the plant to which Darwin was referring.
The entry is marked with a pencilled cross. See numbers 976 and 981 above.

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985. Generally growing near wigwams. Feb.

Senecio acanthifolius Homb. & Jacq. (Asteraceae), specimen at CGE. Marked with a pencilled cross.

985.(bis) Currant bush, generally near to the wigms

Ribes magellanicum Poir. (Grossulariaceae), specimens at CGE and K.
Marked with a pencilled cross. See number 976 above.

986. Lichen universal on rocks summit of mountains. Feb.

I found no collection bearing this number.
In his *Diary* entry for 20 December 1832, Darwin described his successful climbing of 'Bank's Hill', above Bahía Buen Suceso 'I hailed with joy the rocks covered with Lichens and soon was at the very summit.'

987. Lichen, mountain by S. Bay.

I found no collection bearing this number. 'S. Bay' probably means 'Good Success Bay', Bahía Buen Suceso, visited by Darwin in December 1832.

1013. Beech, foliage yellowish green [':Beeche 1013 & 1014' added by Darwin in substitute for '1014', which has been marked out by him.] These Beech trees are the only ['ones' marked out and 'trees' added in pencil by Darwin; 'ones' in the *Specimen Notebook*] which grow on the mountains in this district (Hardy Peninsula). The first is by far the most general, almost universal, and grows to a larger size; the other ['1014' added in pencil by Darwin] follows ['1014' marked out by Darwin] the course of a rivulet or more sheltered rock ['nook' in *Specimen Notebook*] the contrast of the two greens, is at all times striking. Feb.

Nothofagus betuloides (Mirb.) Oerst. (Fagaceae), specimens at CGE and K. Marked with a pencilled cross.
In his *Diary*, Darwin recorded crossing the 'Hardy Peninsula', Península Hardy, Isla Hoste, prov. Magallanes, Chile on 13 February 1833.

1014. Bright green (Beech). as above. [i.e., number 1013] D°. [i.e., 'Feb.']

Nothofagus antarctica (Forst. f.) Oerst. (Fagaceae), specimen at CGE. Marked with a pencilled cross.
Darwin commented on the Antarctic beech in his *Diary*:

> This tree is an evergreen, but the tint of the foliage is brownish yellow: hence the whole landscape has a monotonous sombre appearance; neither is it often enlivened by the rays of the sun.

This was in his entry for 19 December 1832.

1045. Plant in habits much resembling the common rush in England. March.

Marsippospermum grandiflorum (L. f.) Hook. (Juncaceae), specimens at CGE and K. Marked with a pencilled cross. Probably collected in January or February, as Darwin was in the Falkland Islands throughout March 1833.

1052. Lichen, common on mountain, ['and' marked out by Darwin] on rocks. D°. [i.e., 'March']

I did not find this collection.

1055. Excrescences of Fungi; (edible) on the Beech same as in spirits (528).

Cyttaria darwinii Berk. (Cyttariaceae), type specimens at CGE and K. Marked with a pencilled cross. See number 528 in the section on plants in spirits of wine.

1056. Junctions of parasite bush with the Beech of Tierra del Fuego, same as in spirits (532–534)

Myzondendron sp. (Myzodendraceae), no specimens with this number were found.

1073. A square piece cut out of the peat whilst forming. Tierra del Fuego. V. 156. March.

No such specimen was found.
In a letter (copy in the Darwin–Hooker correspondence at Kew, number 4, page 8) written in late January or early February 1844, Darwin advised J. D. Hooker that:

Ehrenberg is further anxious for any earth or more especially peat from T. del Fuego or the Falkland Islands. I had specimens of peat, showing the process of its formation, by plants like Astelia, &c., &c., I do not know whether they were sent to you——I fear they are probably lost, but I daresay a little peaty earth could be shaken off some of the little peat-loving plants of T. del Fugeo. I know you will not grudge some little trouble for so great a naturalist as Ehrenberg.

Christian Gottfried Ehrenberg (1795–1876), Professor of Natural Sciences at the University of Berlin, studied Darwin's diatom specimens (see the next section of this paper).
Page 156 of the *Zoological Diary* reads in part:

['(1073)' not spirits' in margin] Specimen (1073) is cut out of the surface of a peat Bog: This [changed from 'The'] ['above' added in pencil] plant is eminently social; few others grow with it: some small creeping ligneous plants. bearing berrys (978&c) [*Myrteola nummularia*]; another in its form, habits & colour. strikingly resembling the European heaths (1077) [*Empetrum rubrum*]; & a third equally resembling our rush (1045) [*Marsippospermum grandiflorum*] ['It would appear to be necessary under similar circumstances, that the landscape should posses the same forms & tints.—' marked out in pencil] These latter plants & some others doubtless add their effects: But the plant (976) [*Astelia pumila*] & not any sort of moss. is the main agent: (on the sides of hills, where it mostly abounded the surface ['of the peat often' added in pencil] was convex.— By these gradual changes of level, water rests on different parts & thus completes the disorganization of the plant & consolidates the whole.

Page 157 continues, under 'General *Observations*':

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Upon considering these facts, which show how inhospitable the climate of Tierra del is, we are the more surprised to hear from Capt. King that Humming birds have been seen in St of Magellan sipping the flowers of the Fuchsia [*Fuchsia magellanica,* Onagraceae] ['(b)' in margin] & Parrots feeding on the seeds of the Winters bark [*Drimys winteri*, Winteraceae].— I have seen the latter South of the parallel 55°—

The note on page 157, *verso* is

(b) The tropical resemblance given by these birds & Plants is continued in the sea; by the stony branching Corallines, the large. Volutans, Balanidae & Patelliform shells.—

'Corallines' are coralline algae, 'Volutans' a group of gastropods, 'Balanidae' acorn barnacles, and 'Patelliform shells' limpets.
Page 158 has another 'General Observation' regarding plants:

1833 Jan. & Feb. Tierra del Fuego

In the hottest part of the year, the mean maximum (during 37 days) was 55.34 & the thermom often rose to about 60°.—yet there were no Orthoptera. few diptera, still fewer butterflies & no bees, this together with absence of flower feeding beetles (Cychgues) [?] throughly convinced me how poor a climate, that of Tierra del F is.—

'Orthoptera' are grasshoppers, and 'diptera' flies.
A second collection of peat is discussed on page 200, *verso*, under the heading 'Maldonado':

(a) *Turf or Peat* is not generally supposed to be formed within the Tropics; as the Latitude of this place is under 35°. I thought it worth while to enquire ['1386 The two *Sorts*', in margin] respecting its occurrence.—In many marshy places, the earth is very black, & contains much vegetable matter, on one place reposing on this there was another of much less specific gravity & so penetrated by roots & fibres. as almost to be capable of burning.—(leaving however great quantities of ashes).—This I was assured. by a person well capable of judging was the nearest approach he had ever seen to the Turf of Ireland. As there are an abundance of situations, favourable for the production [of] this substance, its existance. only in the above imperfect state shows. that this Latitude is too low for it.—

Like number 1073, this was not found.

1074. A very abundant bush in Tierra del Fuego. D°. [i.e., 'March'] Does not reach above 4 or 500 feet up the mountains; bears a very pleasant but bitter berry; colour and size varies, from white to dark red; I eat great numbers of them.

Pernettya mucronata (L. f.) Gaud. ex Spreng. (Ericaceae), specimens at CGE and K. Marked with a pencilled cross.
In spite of the 'March' date, Darwin was in Tierra del Fuego in December 1832 and January and February 1833. In March, he was in the Falkland Islands.

1075. Bog plant, same as (976) March. ['do', i.e., 'Tierra del Fuego', added by Darwin]

Astelia pumila (Forst. f.) Gaud. (Liliaceae), specimen at CGE. See number 976 above.

1076. Celery, generally growing near the wigwams; very good flavour when boiled in soups &c.

Apium australe Thours (Apiaceae), specimens at CGE and K. Marked with a pencilled cross.
Regarding wigwams, Darwin wrote in his *Diary* entry for 29 December 1832:

Yesterday the Captain went to reconnoitre the bays formed by the many islands at the back of Hermit's. I accompanied him, but the weather is so bleak & raw, as to render boating rater disagreeable. We ascended some of the hills, which as usual, showed us the nakedness of the land.

In most of the coves there were wigwams; some of them had been recently inhabited. The wigwam or Fuegian house is in shape like a cock of hay, about 4 feet high & circular; it can only be the work of an hour, being merely formed of a few branches & imperfectly thatched with grass, rushes &c. As shell fish, the chief source of subsistence, are soon exhausted in any one place, there is a constant necessity for migrating; & hence it comes that these dwellings are so very miserable. It is however evident that the same spot at intervals, is frequented for a succession of years. The wigwam is generally built on a hillock of shells & bones, a large mass weighing many tuns. Wild celery, Scurvy-grass, & other plants invariably grow on this heap of manure, so that by the brighter green of the vegetation the site of a wigwam is pointed out even at a great distance.

Also, see numbers 976, 984, and 986 bis above.

1077. Plant, growing in the peat and closely resembling in general habit and tint our heaths. March. ['do' i.e., 'Tierra del Fugeo' added by Darwin]

Empetrum rubrum Vahl ex Willd. (Empetraceae), specimens at CGE and K. Marked with a pencilled cross. Also see number 976 above.

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1833 Plants.

1154. Lichen growing near the sea very common Falkland Island. March.

Perhaps *Pseudocyphellaria crocata* (L.) Vainio (Stictaceae), specimen at BM.
This is the only lichen specimen of Darwin's from the Falkland Islands that has been found. However, it is just as likely to be numbers 1166 or 1167 as this one.

1155. Parasitic plant on Beech [*Nothofagus* sp.] Tierra del Fuego

Myzodendron brachystachyum DC. (Myzodendraceae). No specimen with this number was found.

1156. Grass. Wollaston Island and other unfrequented places. Dº. [i.e., 'March']

I found no specimen with this number, and no grass labelled as collected on Isla Wollaston. It is probably one of the many species labelled 'S part of Terra del Fuego 1833'.
The *Beagle* was at Wollaston Island on 18 and 19 February 1833.

1157. Syngenesia plant, on sand dumes [i.e., 'dunes'] Wollaston Island; also Falkland Island. Dº [i.e., 'March']

Senecio candidans DC. (Asteraceae), specimen at CGE.
'Syngenesia' is an old name for a member of the Asteraceae.

1158. Alga. Wollaston Island. Dº. [i.e., 'March'] [I found no such specimen.] The 4 last [i.e., 1155, 56, 57, 58], from South part of Tierra del Fuego.

1162. The common grass which so universally covers the whole island, growing on the peat. ['Falkland's' added by Darwin] March.

Cortaderia pilosa (D'Urv.) Hack. (Poaceae), specimen at CGE. Marked with a pencilled cross.
The *Diary* entry for 3 March 1833 is

Took a long walk; this side of the Island is very dreary: the land is low & undulating with stony peaks & bare ridges; it is universally covered by a brown wiry grass, which grows on the peat. In this tract, very few plants are found, & excepting snipes & rabbits, scarcely any animals. The whole landscape from the uniformity of the brown color, has an air of extreme desolation.

On the 24th he added:

For the sake of the fossil shells, I paid a visit of three days to the town. In a long ride I found the country no ways different from what it is in the neighbourhead of the ship. The same entire absence of trees & the same universal covering of brown wiry grass growing on a peat soil.

Port Louis, East Falkland Island was 'the town.'

1163. This is the largest tree [underlined in the *Specimen Notebook*], sometimes growing 2 or 3 feet high. Dº [i.e., 'March'] ['Falklands' added by Darwin]

Chiliotrichum diffusum (Forst.f.) O. Kuntze (Asteraceae), specimens at CGE and E-GL. Marked with a pencilled cross.
Darwin was being a bit facetious in calling this a 'tree'. Moore (1968) states that in the Falkland Islands it reaches a height from 20 to 200 cm.
On his second trip to these islands, in March 1834, when discussing relationships between the islands and Tierra del Fuego, Darwin observed on page 237 of his *Zoological Diary*: 'The plants & insects might easily be transported from Tierra del in the SW furious gales ['(b)' in margin].—'
The note on page 237, *verso* is

(b) I may mention besides my collection, plants as common to this island & Tierra del F. 1157 [*Senecio candidans*]: 1163 [*Chiliotrichum diffusum*]: Bog plant [numbers 976 and 1075, *Astelia pumila*]: Rush-looking plant [number 1045, *Marsippospermun grandiflorum*]: tea plant [number 978, *Myrteola nummularia*]: Celery [number 1076, *Apium australe*]:

All he collected in either the Falkland Islands or Tierra del Fuego, and some in both.

1164. Common low shrub. D° [i.e., 'March']

Baccharis magellanicus (Lam.) Pers. (Asteraceae), specimens at CGE and K.

1165. Plant very abundant resembling in habits our heaths. D° [i.e., 'March']

Empetrum rubrum Vahl ex Willd. (Empetraceae), specimen at CGE.

1166. Lichen, particularly abundant on the level country (1167) All the Lichens are very abundant in the ['this' in *Specimen Notebook*] island. The same lichen (986) [also unknown] which is so common in Tierra del Fuego is found here. March. E. Falklands Island.

See number 1154 above.

1167. Lichen, abundant on hills. D° [i.e., 'March'] D° [i.e., 'E. Falkland Island']

See number 1154 above.

1334. Gum. resin form the bosses of the Hydrocotile Gummi['fera' added by Darwin]. ['June. Maldonado.' marked out and 'Falkland Isd.' added by Darwin] Much oozes out naturally, but if the plant is cut, vast quantities of this Milky fluid flows, which in a few days hardens; said to be good for cuts. D° [i.e., 'March'] D° [i.e., 'E. Falkland Island']

Bolax gummifera (Lam.) Spreng. (Apiaceae). I found no specimen bearing this number, nor any Darwin collection of this taxon.

1345. Fungus (2 species) the flat kind growing on under side of timber. D° [i.e., 'March'] D° [i.e., 'E. Falkland Island']

'*Polyporus versicolor*, Fr.', according to Berkeley (1839: 448), who cited it as growing 'on the underside of timber'. The correct name for this member of the Polyporaceae is *Coriolus versicolor* (L. ex Fr.) Quel. (Miller & Farr, 1975).
The second fungus was cited by Berkeley (1839) as the type of *Sporidesmium adscendens* (Dematiaceae), and by Hooker (1847: 450) as growing 'on the underside of *Polyporus versicolor*.' No specimens of either species were found.
Darwin collected in the vicinity of Maldonado, prov. Maldonado, Uruguay from 28 April through 8 July 1833. Under 'General Observations' in his *Zoological Diary*, he wrote (p. 199):

1833 May:June Maldonado

. . . . . .

The nearly entire absence of trees in such a fine climate & in such deep rich ['in' marked out] soil. is a very surprising & inexplicable fact.—Some have explained it from the strong winds. but in the neighbourhood of Maldonado. this is quite insufficient. the number of rocky & abrupt hills rising out of the plains. renders ample protection for the growth of the most tender.—This same paucity ['extends' marked out] is common both to the modern beds of the Buenos Ayres country & to the granitic rocks of Banda oriental [i.e., that part of southern Uruguay along the Río de la Plata].—Can it originate in the covering of Alluvial soil being of very recent origin.—It is clear that the latter has been formed over a large extent at same time & beneath water: from not containing organic remains probably suddenly.—I was told that near the Arroyo Tapes ['(a)' in margin] there was a wood of Palms. From the number of leaves (used in thatching) it is very probable.—These ['In Lat 35°!' in margin] I

saw which appeared about 20 feet high & thick in proportion.—They grow at Pan de Azucar: on the West bank of the Uruguay they are not found untill you ['cross' marked out] arrive at the Arroyo del Palmas [Prov. Entre Rios, Argentina]

The note on page 199, *verso* reads:

(a) These Palms & some semi-aquatic trees. which follow the courses of the streams, are nearly the only exceptions. to the general & entire absence: it is said that forest timber does not occur for a long distance N of Rio Plata.—In the mountainous country on the Northern half of the Laguna ['del' marked out] de las Patas there is an abundance.— [i.e., Lagoa dos Patos, prov. Rio Grande do Sul, Brazil]

He continues on page 200:

1833 May. June Maldonado

in Latitude 32°. Here likewise a sandy granitic soil commences.—This would appear to be adapted to them.—

Unfortunately, none of these palms seems to have been collected by him.
Earlier, he had under 'Ornithology', written (p. 186):

1833 May. June. Maldonado

. . . . . .

The birds generally are very numerous in the Camp: [i.e., 'campo', countryside] especially Cassicus & Lanius (or more properly Tyrannus).—It is impossible not to be struck with great beauty: the most general colour is yellow. & it is worth noting. that from the prevalence of certain flowers this is the general tint of the pastures.—

Casicus are caciques (Icteridae), *Lanius* are shrikes (Laniidae), and *Tyrannus* are kingbirds (Tyrannidae).

1346. [marked with an inked cross in the margin] Sycophodium [underlined by Darwin and '*erdon*': added above; given as *Lycopodium* in *Specimen Notebook*.] and Lichen. D° [i.e., 'E. Falkland Island'] July. The Sycopodium often grows in open camp [i.e., 'campo' or country] to three or four times the size of this one; but alway, in the same singular shape.

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1833 Plants.

The Lichen grows on damp indurated bare, not very pure sand near the dunes [changed from 'dumes' by Darwin]. It has a very singular appearance, where there is much of it.

Lycoperdon is the genus of puff-balls. Probably collected in the vicinity of Maldonado, Uruguay, rather than the Falkland Islands, given the date of collection as July 1833. I found no specimens of either fungus or lichen bearing this number.

1391. Grass. Cape Blanco [i.e., Cabo Blanco, prov. Santa Cruz, Argentina?]; plant from R. Chupat, [i.e., Río Chubut, prov. Chubut, Argentina], root eat for liquorice.

I found no specimen bearing this number, nor any answering this description. There is no evidence that Darwin was at Cabo Blanco. Lt. Wickham, however, had been on the Río Chubut in February 1833. Perhaps he collected this plant and gave it to Darwin.

1590. Sort of Lichen, growing on the dry sandstone plains of Rio Negro. The patches are circular from size of shilling to half a crown; the ground is blistered, that is the patches are convex and partly hollow underneath. It is abundant.

Probably *Disciseda cervina* (Berk.) Holl. (Lycoperdaceae). I found no specimens of this fungus. Berkeley (1842) based this name on a Darwin collection.
Darwin recorded in his *Diary* entry for 4 August 1833 that he:

> Crossed the river and took a long walk to examine the South Barranca; the country is a level plain, which on the coast forms a perpendicular cliff about 120 feet high. Having walked several miles along the coast I with difficulty found a pass to ascend to the plain above. This plain has a very sterile appearance; it is covered with thorny bushes & a dry looking grass & will for ever remain nearly useless to mankind. It is in this geological formation that the Salinas or natural salt-pans occur; excepting immediately after heavy rain no fresh water can be found. The sandstone so abounds with salt, that all springs are inevitably very brackish. The vegetation from the same cause assumes a peculiar appearance; there are many sorts of bushes but all have formidable thorns which would seem to tell the stranger not to enter these inhospitable plains.

The river was the Río Negro. As here he was on its south side, he was in the province of Río Negro, Argentina.

1593. Bearded wheat, injured by the Pulvilho. V. 208.

Triticum aestivum L. (Poaceae), no specimens found.
'V. 208', of course, is a note to see page 208 of the *Zoological Diary*. Unfortunately, this page is missing. However, Henslow (1844) published a 'Memorandum' of Darwin's that either reflects or actually reprints this information. That the latter is probably the case can be deduced from Henslow's referring to the *Plant Notes* as 'Darwin's *memoranda*' in a letter to J. D. Hooker of 9 September 1843 (Porter, 1980*a*). Darwin's comments and Henslow's introduction to them follow, as they are not included in Barrett's (1977) anthology of Darwin's published writings:

> RUST IN WHEAT
>
> It was good advice which I once heard given by a dealer in objects of natural history to a friend who had offered to procure specimens for him in some foreign country he was about to visit—'If you really wish to serve me,' said he, 'do not send me pretty specimens, nor yet anything that you may fancy particularly curious. I am already overstocked with such objects. Just keep a jar at hand, filled with spirits of wine or gin, and whenever you see some very common looking reptile or insect, put it into the jar. The chances are, that everything you may consider least worth preserving will be of most service to me.' The fact is, that persons who are not naturalists are no judges of what objects are most likely to be of interest in a strictly scientific point of view. Botanists would rather receive one of our most common weeds from a newly-discovered or newly-explored country than a new species of an already known genus. There are higher departments of botany than mere collectors of specimens are aware of. To ascertain the geographical distribution of a well-known species is a point of vastly superior interest to the mere acquisition of a rare specimen. My friend Darwin well understood this (but then he is an accomplished naturalist), when he so often stepped aside from his geological and zoological pursuits, to preserve specimens of plants for me; though botany formed no portion of his immediate studies. I suppose there are few persons possessing a healthy taste for the details of real adventure, who have to by this time read his most interesting 'Journal of the Voyage of the Beagle;' and from what they must there have seen of his appetite for observation, they will not be surprised to hear that I have just received from him two blighted ears of Wheat, which few persons would have thought it worth while to carry with them round the world, but which he brought home upon the chance of their affording some information on the cause of those extraordinary and devasting blights to which the crops are occasionally subject in South America. As the memorandum he has made upon the subject will possess an interest in the eyes of agriculturists, I shall here present it to your readers; and then mention the cause to which these blights must be ascribed:——

MR. DARWIN'S MEMORANDUM
'*Northern Bank of the Plata, Nov.* 26–30, 1833.
'No. 1593——Bearded Wheat materially injured by a blight called the 'Polvillo.' When a field is attacked, it seems, even at a distance, burnt up, and of a red appearance. On walking amongst the Corn, the shoes and trowsers become covered with a fine rust-coloured powder: hence the name. The powder is lodged in minute oblong patches, beneath the epidermis, which may at first be seen partially raised, and a forming a scale. It attacks all parts indiscriminately. If the leaves are a little infected, the grains of Corn are light and dry; but if the ear and stalk are attacked, the crop is entirely spoilt. The blight is not observed before the grain is pretty full, and its attacks are very rapid——three or four days being sufficient to spoil a whole field. It is endemic in the whole district, though not equally destructive throughout. From this cause, last year, when the weather was wet, no grain was gathered. Hence an immense importation of flour took place from North America. This year, the weather being fine and dry, the blight will destroy or injure the greater part of all the crops. Fields thrown up in Buts, clear of weeds on high ground, are equally attacked with those of less favoured aspect. It is here attributed to the sun's action after heavy dews. Crops grown from grain of the country, from the Cape of Good Hope, and from Rio Negro in Patagonia, were all more or less affected. It is remarkable that the Wheat at Rio Negro itself (which is grown on low diluvial lands) produced, even last year, its immense crop uninjured. This blight is a prodigious evil to the country, and most mortifying to the agriculturist, who does not know that all his labour will be lost, till within a week or fortnight of the time when he was expecting to reap the fruits of it.'

Henslow states that he sent a specimen of this 'rust or red-gum' to Berkeley, who identified it as 'Uredo linearis' (*Puccinia graminis* Pers., Pucciniaceae), common wheat rust.

1641. Lichen common on pebbles. June. P. Desire.

I found no specimens with this number.
Darwin was not in Puerto Deseado, prov. Santa Cruz, Argentina in June 1834. He *was* there from 23 December 1833 through 4 January 1834, and 20 through 22 January 1834. In his *Diary* entry for 24 December he recorded:

Took a long walk on the North side: after ascending some rocks there is a great *level* plain, which extends in every direction but is divided by vallies. I thought I had seen some desart looking country near B. Blanca; but the land in this neighbourhead so far exceeds it in sterility, that this alone deserves the name of a desart. The plain is composed of gravel with very little vegetation & not a drop of water.

Bahía Blanca is in the province of Buenos Aires.

1930. Gum-resin, exuded from the bosses of the Hydrocotyle gummip['era' added by Darwin who also underlined the word] ['for' added by Darwin] chemical analysis ['Falklands' added by Darwin]

Bolax gummifera (Lam.) Spreng. (Apiaceae), no specimens found.
The *Beagle* visited the Falkland Islands for the second time in March and early April 1834.

River S. Cruz [added by Darwin]

2039. Very sweet smelling, plant; with a rather biting ['S. Cruz' added in margin by Covington, parentheses placed around it by Darwin, as are lines above and below: (S. Cruz)] arromatic taste; used for making tea by the seamen.

Satureja darwinii (Benth.) Briq., Lamiaceae, type specimens at CGE and K. Marked with a pencilled cross.

['NB' added by Darwin in margin] As all these plants were collected during end of April and beginning of May; they are late Autumnal plants. I collected every one in flower; as indeed I have done every-where in Patagonia. Country same dry sterile shingle bed as before ['from the sea to the Andes at the sources of S. Cruz', added by Darwin.]

During 18 April to 8 May 1834, Darwin, Captain Robert FitzRoy, and a number of officers and men of the *Beagle* travelled by boat up the Río Santa Cruz in an effort to reach the eastern slopes of the Andes. They failed to do so by only a few miles, but were driven to return because of a lack of provisions. Darwin covered several pages of his *Diary* with entries on this trip, but the comments on plants are few. However, he did make the following observations in the *Zoological Diary* (p. 260):

1834 May & April. Zoology. S. Cruz

['*S. Cruz*' in margin] During the expedition up the river I ['noticed' marked out] found the same animals, birds, insects & plants, which I have collected near to the coast: this extreme similarity in the productions of the sterile plains of shingle is a very striking feature in the whole of S. Patagonia. The geology likewise being similar, one view can hardly be told from another.— . . .
. . . (I suspect Patagonia has but few productions of its own.—is the Botany sufficiently known to tell.—['(c)' in margin] The extreme infertility, even close to running water, has

Page 260, *verso* continues:

has often much surprised me.—At different times I have attributed this general sterility, to the salt ['to' marked out] contained in the sandy clay.—the extreme dryness of the climate, (which is an undoubted fact).—the poorness of the soil of the gravel beds.—& to no creation having taken place. since this country was elevated (I yet think this applies to the Northern parts): I am now most inclined to attribute it all to the poorness of the soil.—Yet in the Lava country, where there was water, it was but little better!.—

2040. Plant, on the dry banks; (flowers minute?) High up the river; interior Dº [i.e., 'River S. Cruz']

Euphorbia portulacoides L. emend. Spreng. (Euphorbiaceae), specimen at CGE.

2041–2042. Plants, 140 miles up ['The' in *Specimen Notebook*] river; grows rather near river; character of country same, as at coast; as these plants, I never saw to the coast are they not cordilleras plants crawling downwards. Dº [i.e., 'River S. Cruz']

Number 2041 is *Quinchamalium chilense* Mol. (Santalaceae), specimens at CGE, E-GL, and K. Number 2042 is *Oreopolis glacialis* (Poepp. & Endl.) Ricardi (Rubiaceae), specimen at CGE. Marked with a pencilled cross.
According to Darwin's *Diary* entry for 4 May, the highest up the Río Santa Cruz that they travelled was 140 miles. These specimens, then, were collected there on that date.

2043. Very adhesive, abundant about the lava cliffs, 8 or 900 feet above the sea; in the interior. Dº [i.e., 'River S. Cruz']

Senecio tricuspidatus Hook. & Arn. (Asteraceae), type specimens at CGE, E-GL, and K. Marked with a pencilled cross.

2044. Same locality; shady nooks amongst the rocks. Dº ['River S. Cruz']

Sisymbrium magellanicum (Juss. ex Pers.) Hook. f. (Brassicaceae), specimens at CGE and K. Marked with a pencilled cross.

2045. Plant, interior. Dº [i.e., 'River S. Cruz']

Galium richardianum (Gill. ex Hook. & Arn.) Endl. ex Walp. (Rubiaceae), specimens at CGE. Marked with a pencilled cross.

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1834 Plants.

2046. Grass; this characterizes all the arid plains of South Patagonia. D° [i.e., 'River S. Cruz'] S. Cruz.

Stipa speciosa Trin. & Rupr. (Poaceae), specimens at CGE and K. Marked with a pencilled cross.

2047. Plant, interior. D° [i.e., 'S. Cruz']

Descurainia appendiculata (Griseb.) O.E. Schultz (Brassicaceae), specimens at CGE and K. Marked with a pencilled cross.

2048. D° [i.e., 'Plant, interior'] on the wet shingle; river side. D° [i.e., 'S. Cruz']

Arenaria lanuginosa (Michx.) Rohrb. (Caryophyllaceae), specimens at CGE and K.
The *Beagle* visited the Isla de Chiloé, prov. Chiloé, Chile from 28 June through 13 July 1834. While Darwin entered no collections from the island in the *Plant Notes*, he made the following entries in the *Zoological Diary* under 'Ornithology'
Page 265:

1834 July Chiloe

. . . The commonest site, where these birds may be found, is on marshy open ground where a Bromelia (?). (a plant bearing -pine-apple sort of ['edible' in margin] fruits with long toothed leaves) forms thickets.—

Page 266:

1834 July Chiloe

. . . There are at this time of year. scarcely any flowers. & none whatever where the above plants grow.—

Page 265, *verso*:

['(a)' in margin] These forest, wear from the climate a gloomy look: yet in many respects they have a more Tropical appearance, than the latitude would lead one to expect.—The woods contain various sorts of trees: they are very thickly placed together: they are much covered with parasitical plants, many of them monocotylidenous.—An Arborescent grass ['jointed like Bamboo' in margin]. which intertwines the trees to the height of 30 feet is very abundant: the Ferns are singularly large.—I no where saw the Beech tree which forms the whole forests of T. del Fuego.—the Winters bark is common to both countries.—

Opposite this entry is written 'Cop orinthology' in pencil by Darwin. An edited version was entered into the *Ornithological Notes* (see Barlow, 1963, p. 253). 'Winters bark' is *Drimys winteri* Forst. (Winteraceae), which Darwin mentioned several times in his *Diary*, but which he seems never to have collected.
Apples (*Malus pumila* Mill. (Rosaceae), no specimens found) are not mentioned for the Isla de Chiloé in the *Diary* but he wrote the following in the *Zoological Diary* under 'Apple Trees' (p. 266):

1834 July Chiloe

In Chiloe the inhabitants have a mode of propagating trees so that in three years it is possible to have an orchard of large fruit-bearing trees.—At the lower part of every branch, there are small (2 or 3 1/10th of inch) conical, brown, wrinkled projecting points; these are roots, as may be seen when any mud has fallen on the tree.—A branch, as thick as a man's thigh is chosen, & is cut off. just beneath a group of points; this

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1834 July Chiloe

is done in *very early* spring: the extremities of all the sub-branches ['are' marked out] being lopped off. it is placed about 2 feet deep in the ground with a support.—the ensuing summer it throws out very long shoots, & sometimes bears a few apples (I saw one which had most unusually produced as many as 23): the 2d summer, the former shoot threw out others: in the third summer it bears a good deal of fruit & is (as I have seen) a well wooded tree.—Are the incipient roots present in ['ap trees in' added] any part of England? or is this whole process owing to the extremely damp nature of the climate? it is a most valuable method where applicable.—I have noticed that in the Applles, not above one in a hundred will have any seeds in its core.—

A shortened version, with some additional information is given in Darwin (1839, pp. 363–364).

2377. Lichen. Corferra. [i.e., 'conferva'; no such specimen was found.] consists of bunches of slightly branched hairs. coloured [changed by Darwin from 'colored'] 'Reddish orange'; grows commonly on the dead twigs of trees, here at Chonos and in Tierra del Fuego. The hairs when examined in ['the' added by Darwin] ca['bin' added by Darwin] (from hygemetrical ['hygrometical' in *Zoological Diary*] properties ?) moved and started. The hairs have their extremities rounded truncate [changed from 'touncate' by Darwin], when examined in water, seem to consist of an outer vessel, containing an inner with a red fluid; this fluid is divided transversely, apparently in very same manner as the green matter in Conferra ['conferva' in *Zoological Diary*]; each compartment is composed of 3 or 4 little sph['e' added by Darwin]res of the red, matter, which either only touch or run into each other more or less. On the hairs there are irregular lumps, which contain a particle of the red matter, separate from the column. These [changed from 'There' by Darwin] are buds and thin young b['ra' added by Darwin]nches may be seen rising from them. Decemr. Chonos. Archipelago.

The above description is copied from page 287 of the *Zoological Diary*, where it has been marked out by a vertical pencilled line. 'Lichen = *Conferva 2377* Plate 14: Fig. 4 much magnified' is written in the margin of the *Zoological Diary* opposite this entry.

Jan-y. 1835.

2475. Little plant, very abundant, on hills. This [underlined in *Specimen Notebook*] and the bog plant of Tierra del Fuego, (& grass) here form great beds of peat. ['& the' added in *Specimen Notebook*] Latitude 45°!! December. 1834. ['V. 314' in *Specimen Notebook*, see below] Chonos. Archip. Midship. Bay.

Donatia fascicularis Forst. & Forst. (Donatiaceae), specimens at CGE and K. Marked with a pencilled cross.
Darwin was in the Archipiélago de los Chonos, provinces of Aisén and Chiloé, Chile from 13 December 1834 through 15 January 1835. Midship Bay is unidentified. He made the following observations in his *Zoological Diary* under 'Vegetation' (p. 313):

1835 Jan: Chonos Archi: Gen: Observ:

. . . . . .

At S. Pedro. (SE point of Chiloe) I first noticed the Antarctic Beech ['(a)' in margin] of T del Fuego [i.e., *Nothofagus* spp.] but at a considerable elevation ['&' marked out] very stunted in its form.—In Midship Bay (Chonos) Lat: 45°–46. This tree grew to a fair size. at the Waters edge ['&' marked out] formed nearly 1/5th of the Wood.—From this point it doubtless continues to augment. till in T-del Fuego we find the woods essentially composed of it alone.—The arborescent grass which we see in Lowes Harbor (& perhaps in Lemoos) [i.e.,

Isla Lemuy] is not found in this Midship Bay; Hence together with the numbers of the Beech the forest bears a different aspect from what it does in Chiloe.—Here Cryptogamic flora. has reached its perfection (V Specimens) [i.e., number 2476] In T del Fuego I have remarked, that the forest appears to be too dank & cold

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1835 Jan: Chonos Archip: Gen: Observ:

for even this order of plants: In this Latitude ['45° S' added in pencil] also I see that level pieces of ground instead of supporting trees, become covered with a thick bed of Peat ['Peat' in margin]. Trees ['never' marked out in pencil; 'seldom' added in pencil] grow ['but' marked out] on a slope in T del Fuego: whereas in Chiloe the plains forms the densest forest. Here the climate seems more to resemble that of T del Fuego: under it. is remarked by old Navigators on this coast, that in the whole distance between Chiloe & C. Horn. there is no great difference of climate.—The peat is here formed by the plant called 'Bog Plant' [*Astelia pumila*, number 976; 'in T del Fuego' in margin]. & another ['.' marked out in pencil] Specimen (2475): [*Donatia fascicularis*; 'It suppor' marked out] These socialle plants support a few tufts of coarse grass, stunted *little* dwarf beeches & the 'Tea Plant' ['of Falklands' in margin, *Myrteola nummularia*, number 978]—The aspect of the Bog is precisely that of T del Fuego.] [bracket added in pencil]—The Lat. 45° [minutes not added] !—

The note on page 313, *verso* is

(a) These remarks about the Beech, must be taken with caution; for I see ne [none?] of the species. least common in T del Fuego is common in central forest of Chiloe]

2476. Cryptogam['ous' added by Darwin]; (all ensuing ones) D° [i.e., 'December. 1834'] D° [i.e., 'Chonos. Archip., Midship. Bay.']
All the Cryptogamio were gathered in 5 minutes and within a space of 10 yards square. A most wonderful profusion. [Marked with a pencilled cross] ['How many species??' added marginally in pencil by Darwin; also marked with a pencilled cross.]

Darwin constantly referred to mosses & liverworts as cryptogams. Specimens of the following were collected by him in the 'Chonos Archepelago' (Archipiélago de los Chonos, prov. Aisén, Chile) and are at the herbaria indicated.

Liverworts:

Plagiochila neesiana, Plagiochilaceae (types of *Jungermannia chonotica* Taylor at BM and CGE).
Lepidozia chordulifera (Taylor), Lepidoziaceae (type at BM).
Bazzania peruviana (Nees) Trev., Lepidoziaceae (BM and CGE).
Schistochila lamellata (Hook.) Dum., Schistochilaceae (BM and CGE).

Mosses:

Pterygophyllum anomalum (Schw.) Mitt., Hookeriaceae (BM and MANCH).
Pt. denticulatum Mitt. (BM and MANCH).
Hypopterygium arbuscula (P. Beauv.) Brid., Hypopterygiaceae (BM and MANCH).
H. didictyon C. Muller (BM).

All could have been part of this collection.
On 11 January 1844, Darwin wrote to J. D. Hooker that (Allan, 1977: 138):

My cryptogamic collection was sent to Berkeley; it was not large; I do not believe he has yet published an account, but he wrote to me some years ago that he had described & mislaid all his descriptions. Wd it not be well for you to put yourself in communication with him; as otherwise some things will perhaps be twice laboured over.——My best (though poor) collection of the cryptogam. was from the Chonos Islands.

The Reverend Miles Joseph Berkeley (1803–89) described many of Darwin's fungi and a few lichens (Berkeley, 1839, 1842, 1845), but the mosses, liverworts, and some other lichens were published on by others.

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1835 Jan-y. Plants. Chonos. Archipelago.

2528. Wild Potatoes [*Solanum tuberosum* var. *vulgare* Hook. f. (Solanaceae), specimens at CGE. Marked with a pencilled cross. The following description was copied by Covington from pages 314 and 314 *verso* of the *Zoological Diary*.]

Wild plants grow in abundance on all the islands of this group; the furthest point south where Mr. Stokes saw them was at Lemoos; But Mr. Lowe tells me the wild Indians in the Gulf of Trinidad know them well, call them Aquina and eat them, and say they grow in that neighbourhood. At Lowes harbour (Lat. 44°) I visited a large bed; They appear a sociable plant; in all parts they grow in a sandy-shelly soil close to the beach, where the trees are not as close together; They are now (Jan-y 15th) in bud and flower; the tubers ['(1142) in spirits' written in the margin] are few and small, especially in the plants in the shade, with luxuriant foliage. yet I saw one, oval with the longest diameter two inches in length. They are very watery and shrink, when boiled; When raw have the smell of Potatoes of Europe; When cooked are rather insipid, but not bitter [underlined in *Zoological Diary*] or ill-tasted and may be eat with impunity, (V. Humboldt. New Spain Vol. II P. [ ]) The stem of one plant from the ground to tip ['top' in *Zoological Diary*] of upper leaf measured exactly 4 feet!!—These plants are unquestionably here amongst these ['the' in *Zoological Diary*] uninhabited Islands in their wild state (Indians of south recognizing them and ['&' marked out in *Zoological Diary*] giving them Indian name; general occurance on all, even very small inlets &c &c). They grow on a sandy soil, with much vegetable matter. The Climate is very humid and little sunshine. [The following was added later to the *Zoological Diary*:] The Indians of Chiloe speaking the Williche language give them a different name from Aquina, the word of ['the' marked out] west Patagonia The Potatoes has been found near Valparaiso. V. Sabine Horticultural Society?

'Mr. Stokes' is John Lort Stokes (1812–85), Mate and Assistant Surveyor on the *Beagle*. 'Lemoos' is Isla Lemu, prov. Aisén, Chile. William Lowe was Pilot of the *Adventure*, sailing and surveying with the *Beagle*; Golfo Trinidad is in the province of Magallanes, Chile. 'Humboldt' refers to his 1822 book, and 'Sabine' to his 1824 paper, both listed in the bibliography of the present paper. In the *Zoological Diary*, 'and' is given as '&', and several words are or are not capitalized that are or not here. Opposite the entry in the *Zoological Diary* has been written 'copied'.
Darwin made the followng entry in his *Diary* on 7 January 1835:

I think this place will soon be inhabited; there is a great abundance of muscles & oysters; wild potatoes grow in plenty, one which I measured was oval, & its longest diameter two inches. Mr. Stokes & his party cooked & ate them & found them watery but good.

Lowe's Harbour was 'this place'

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1835 Plants.

3056. Lichen, lying, without any adhesion on the bare sand, at Iquique ['Peru' added by Darwin. This locality is now in Chile.] elevation 2–3000 feet; (where clouds often hang) sufficiently abundant in patches to give a green tint to sand seen from ['a' added by Darwin] distan['ce' added by Darwin]; I saw one other species of minute yellow Lichen on old Bones, and a Cactus on lofty rocks on coast. Besides these three, there is neither Cryptogamio or Phanergamio, ['plants' added in margin by Darwin] on coast or for 14 leagues inland; and these [changed by Darwin from 'this'] species are only seen on the coast mountains. ['Coquimbo.' marked out by Darwin] [Marked with a pencilled cross.]

No specimens of this lichen, nor of the other or the cactus, were found. Darwin wrote to J. D. Hooker in late April or early May 1845 (copy in the Darwin–Hooker correspondence at Kew, number 33, page 63): 'The loose lichen was lying on the sand of the real deserts of Iquique. Henslow said it was a Cladonia: I suppose he sent it with rest of the Crypt. to Berkeley.'
In his *Diary* entry for 13 July 1835, Darwin wrote:

On the coast mountains at about 2000 ft. elevation, the bare sand was in places strewed over with an unattached greenish Lichen, in form like those which grow on old stumps: this in a few spots was sufficiently abundant to tinge the sand when seen from a little distance, of a yellowish color. I also saw another minute species of Lichen on the old bones. And where the first kind was lying, there were in the clefts of the rocks a *few* Cacti. These are supported by the dense clouds which generally rest on the land at this height. Excepting these, I saw no one plant.

These coastal mountains were inland from the port of Iquique.

3153. 3154. 3155. Lichen. San. Lorenzo. Lima. 1000 feet. region of winter clouds. August.

I found no specimens with these numbers, nor from this locality. Darwin wrote to J. D. Hooker in April 1845 (copy in the Darwin–Hooker correspondence at Kew, number 31, page 60): 'The enclosed little lichens came from near summit of *most* barren island of San Lorenzo off Lima: What on earth made me think them worth collecting I know not——please throw them away.'
The *Diary* entry for 20 July 1835 includes the following:

The barren Isd of S. Lorenzo which forms the harbor is nearly the only secure walk. I climbed one day to the highest part, nearly 1200 ft. high. This is within the limit of the region of Clouds at this season. I there met with half a dozen different kinds of plants & an abundance of Cryptogamic vegetation; on the hills near Lima, at a little greater elevation, the ground is carpeted with moss & there are some beautiful yellow lilies called Amancaes.

Unfortunately, he seems not to have collected any of these 'beautiful yellow lilies.' This was 'nearly the only secure walk' because civil war was then raging in and around Lima.

3192. Crypogamio, plant, same locality with number 3153 &c &c. D° [i.e., see number 3153]

I found no specimen with this number.

Septr. Galapagos Islands.

3233. Plants, on rocky [changed from 'rocks' by Darwin] most barren hill['s' added by Darwin], Volcanic . . . Chatham Island.

I found no specimen bearing this number. An 'x' is inked in the margin, added by Darwin
Darwin's *Diary* entry for 16 September 1835 describes his first landfall in the Galápagos, on Isla San Cristóbal (Chatham Island):

We landed for an hour on the N.W. end of Chatham Isd. These islands at a distance have a sloping uniform outline, excepting where broken by sundry paps & hillocks; the whole black Lava, *completely* covered by small leafless brushwood & low trees. The fragments of Lava where most porous, are reddish like cinders; the stunted trees show little signs of life. The black rocks heated by the rays of the Vertical sun, like a stove, give to the air a close & sultry feeling. The plants also smell unpleasantly. The country was compared to what we might imagine the cultivated parts of the Infernal regions to be.

He later (21 September) likened the landscape to 'the iron furnaces near Wolverhampton.'

Charles Island.

3242. Herbaceous Shrub, common in the higher and inland parts, smell something like a Geranium.

Scalesia affinis Hook.f. (Asteraceae), type specimen at CGE.
Darwin's *Diary* entry for 26 and 27 September 1835 includes the comment: 'I ascended the highest hill in the Isd, 2000 feet; it was covered in its upper part with coarse grass & Shrubs.' This hill was probably the Sierra de Paja, which reaches a height of about 1,800 feet.

3243. Woody Shrub; odour like Honeysuckle.

Lantana peduncularis Anderss. (Verbenaceae), specimen at CGE.

3244. Parasite, growing on various kinds of trees.

Phoradendron henslovii (Hook. f.) Robins. (Viscaceae), type specimen at CGE.
In the *Diary* entry for 23 and 24 September 1835, the following is included:

Since leaving Brazil we have not seen so Tropical a Landscape, but there is a great deficiency in the absence of the lofty, various & all-beautiful trees of that country. It will not easily be imagined how pleasant the change was from Peru & Northern Chili, in walking in the pathways to find *black mud* and on the trees to see mosses, ferns & Lichens & Parasitical plants adhaering. Owing to an unusual quantity of rain at this time of year, I suspect we have seen the Island at its full advantage.

The 'Island' was Isla Floreana (Charles Island), and the only truly 'Parasitical plants' seen was this *Phoradendron*.

Chatham Island

3253. Common spiny bush, small scarlet flowers.

Castela galapageia Hook. f. (Simaroubaceae), type specimens at CGE and K. Marked with a pencilled cross.
This was certainly one of the plants Darwin was describing in his *Diary* when on Charles Island he entered for 19 and 20 September:

Upon first arriving I described the land as covered with leafless brushwood; & such certainly is the *appearance*. I believe, however, almost every plant or tree is now both in flower & leaf. But the most prevalent kinds are ornamented with but very few & these of a brown color.

3254. The commonest bush in the Island. grows straggling, ['6' added by Darwin] to 12 feet high; leaves brownish green, very few in numbers;

Scalesia incisa Hook.f. (Asteraceae), type specimen at CGE. Marked with a pencilled cross.

3255. The largest tree; low thick, 1 to 2 feet in diameter, crooked branches, few leaves; Balsamic odour, trunk thick in proportion; common.

Bursera graveolens (HBK.) Trian. & Planch. (Burseraceae), I found no specimens of this collection, but from Darwin's description, it can be no other species. Marked with a pencilled cross.

3256. Wild cotton tree, one of the commonest shrubs.

Gossypium darwinii Watt (Malvaceae), specimen at CGE.

3257. Green thickets, bright green generally common near sea side.

Maytenus octogona (L'Her.) DC. (Celastraceae), type specimens of *M. obovatus* Hook.f., at CGE and K.

[page] (11

1835 Septr. Plants.

3258. C['onvovulus' added by Darwin] like plant, on sea-sand; flower pink. Chatham Island. ['Ipomoea maritima' added by Hooker]

Ipomaea pes-caprae (L.) R. Br. (Convolvulaceae), specimen at CGE.

3259. One of the commonest low bushes, small yellow flower. from D° [i.e., 'Chatham Island']

Waltheria ovata Cav. (Sterculiaceae), type specimen of *W. reticulata* Hook.f., at CGE. Marked with a pencilled cross.

—James Island. Octobr.—

3284. Cactus. Flower yellow; leaves rounded oval attached to each other in same plane generally; branches in different planes; trunk cylindrical, tapers but little 6 to 10 feet ['ft.' in *Specimen Notebook*] high; beset with strong spines, diverging [changed from 'deveging' by Darwin] from the [not in *Specimen Notebook*] [added by Darwin, 'p']oints hence ['hirsute' added by Darwin] with stars. Common on rocky [underlined in *Specimen Notebook*] ground.

Opuntia galapageia Henslow (Cactaceae), type specimen at CGE. There is a drawing of this species in the margin of the *Specimen Notebook*.
Darwin's *Diary* contains several references to the feeding on plants of the endemic giant tortoise (*Geochelone elephantopus*) and one of the endemic land iguanas (*Conolophus subcristatus*). Here follow his pertinent notes from the *Zoological Diary*:
Under 'Tortoise' (page 329):

The Tortoises which live on those Islands ['(a)' in margin, marked out in pencil]. where there is no water. or in dry parts of others. live chiefly on the succulent Cactus [i.e., this species of *Opuntia*, and others]: I have seen, those which live in the higher parts, eating largely of a pale green filamentous Lichen, [*Ramelina usnea* Howe (Usneaceae)] which hangs like tresses from the boughs of the trees, also various leaves & [illegible word marked out] copiously the ['berrys' marked out in pencil and 'berries' added in pencil] of [changed in pencil from 'or'] a tree (called Guayavitas) [i.e., *Psidium galapageium*, see number 3293 below] which ['a' in margin, added in pencil] are acid & Austere. ['a' added in pencil]

The note on page 329, *verso* is:

(a) The dung of the Tortoise is very large & resembles that of the S. American. ostrich

Under '*Amblyrhyncus terrestrial*' (pages 338 and 339):

Those individuals & they are the greater number, which inhabit the extremely arid land, ['can' marked out] never drink water during nearly the whole year.—These eat much of the succulent Cactus, which is in evident high esteem. When a piece [changed from 'pieces'] is thrown towards them. each will try to seize & carry it away. as dogs do with a bone.—They eat however deliberately. without chewing the pieces.—The Cactus is in request amongst all animals, I have seen ['a' marked out] little birds [i.e., finches] picking at the opposite end of a piece which ['the' marked out] a Lizard was eating: & afterwards it would hop. on with complete indifference on its back.—In their stomachs ['I ha' marked out] vegetable fibres, leaves of different trees. especially the Mimosa [i.e., *Acacia* spp.] were always found. In the high damp country. their chief food is ['to' marked out] the berry. called Guayavitas; it is the same which the Torioses eat. & has an acid astringent taste.—Here also they are said to drink water.—To obtain the leaves they climb short heights up the trees: I have frequently seen them clinging to the branches of the Mimosa.—Thus their habits are as entirely herbivorous as in the black sea-kind [i.e., the marine iguana, *Amblyrhynchus cristatus*].—

On page 339, *verso* is the note:

Is any other genus, amongst the Sauriens Herbivorous? I cannot help suspecting that this genus, the species of which are so well adapted to their respective localities, is peculiar to this group of Is?—

Added to this later and then marked out in pencil is, 'The Inhabitants of Tahiti had never seen or heard of.'
Several comments on the eating of plants or seeds by birds were included on pages 340 and 341 under 'Ornithology':

I should state that all the species [of finches] (& doves) feed together in great numbers indiscriminately. their favourite resort. being in the dry long grass in the lower & dry parts of Islands. where in the soil many seeds are lying dormant.—The Icterus like Finch (3320–23) is distinct in its habits ['(a)' in margin]; its general resort is hopping & climbing about the Cactus trees picking with its sharp beak the flower or fruit.—Not infrequently however it alights & feeds with the flocks of other species on the ground.—

The 'Icterus like Finch' probably was the cactus finch (*Geospiza scandens*); *Icterus* is a genus of orioles (Icteridae). 'Gross-beaks' were large-beaked specimens of ground finches (*Geospiza* spp.).
The note on page 341, *verso* is

(a) The Gross-beaks are very injurious. The [i.e., They] will stock [i.e., stalk] seeds & plants, when buried 6 inches beneath the ground

3285. Fungus, on Mimosa tree. [inked 'x' added in margin by Darwin]

Cited by Berkeley (1842) as '*Polyporus igniarius* . . . var. *scaber*, Berk.,' (Polyporaceae); this is the type, and the specimen was not found. The current name for the species is *Phellinus rimosus* (Berkeley) Pil. (Reid *et al.*, 1981), but it is not clear that the collection represents this taxon. Darwin collected no specimens of *Mimosa* in the Galapagos Islands, but he did gather two species of *Acacia*.

3293. Large, succulent, clinging plant, grows high up in damp parts [changed from 'plants' by Darwin.].

Peperomia galioides HBK. (Piperaceae), type specimens of *P. flagelliformis* Hook.f., at CGE and K.

3294. Sy['n']g['ynesia' added by Darwin]; the characteristic and abundant tree in the high ground ['2000–3000 ft' added by Darwin]; grows to a good size; foliage pale bright green, trunk well formed cylindrical, branches regular.

Scalesia pedunculata Hook.f. (Asteraceae), type specimen at CGE. Marked with a pencilled cross.
For 9 October 1835, Darwin described in his *Diary* a hike into the interior of Isla Santiago (James Island):

Taking with us a guide we proceeded into the interior & higher parts of the Island, where there was a small party employed in hunting the Tortoise. Our walk was a long one. At about six miles distance & an elevation of perhaps 2000 ft. the country begins to show a green color. Here there are a couple of hovels where the men reside. Lower down the land is like that of Chatham Isd,——very dry & the trees nearly leafless. I noticed, however, that those of the same species attained a much greater size here than in any other part. The vegetation here deserved the title of a Wood: the trees were, however, far from tall & their branches low & crooked. [Footnote: 'I saw some having circumference of 8 feet, & several of 6 feet.'] About two miles from the Hovels & probably at an additional 1000 ft. elevation, the Springs are situated. They are very trifling ones, but the water good & deliciously cold. They afford the only watering places as yet discovered in the interior. During the greater part of each day clouds hang over this highest land: the

vapour condensed by the trees drips down like rain. Hence we have a brightly green & damp vegetation & muddy soil. The contrast to the sight & sensation of the body is very delightful after the glaring dry country beneath. . . . The tropical character of the Vegetation is stamped by the commonest *tree* being covered with compound flowers of the order of Syngynesia.

This 'tree' was *Scalesia pedunculata*, the largest and most common species of this genus of the sunflower family.

3295. Common tree, in the intermediate ground ['Psidium galapageium, H. f.?' added by Hooker]; the berrys are eaten by the inhabitants and form main food for Tortoise and yellow Lizard, called Guyavitas, taste. acid, little sweet, astringent and turpentinic

Psidium galapageium Hook. f. (Myrtaceae), type specimens at CGE and K. Marked with a pencilled cross.

3391. Lichen. Tahiti. Novembr. [inked 'x' in margin by Darwin]

Not a lichen, but a fungus. Cited by Berkeley (1842) as '*Hexagona fasciata*,' a new species of Polyporaceae, and illustrated in his plate IX. This type collection was not found.

3595. Fungus. common on the decaying trunks of the Cocoa nut tree. Keeling Island. April 1836.

This is probably the '*Polyporus lucidus*' reported by Henslow (1838: 347): 'These were sent to Mr. Berkeley. . . .' Berkeley, however, did not include the collection in any of his publications on Darwin's fungi (1839, 1842, 1845). No specimens were found of this collection. The present name for this taxon is *Ganoderma lucidum* (Leysser ex Fr.) Karst (Polyporaceae) (Miller & Farr, 1975).

3596. Fruit of a large tree; milky, green, grows by pairs or three; likewise, root, of a small plant, which is sweet, when cooked and is sometimes eaten. from D° [i.e., 'Keeling Island'] D° [i.e., 'April. 1836']

The fruit is *Nesiosperma oppositifolia* (Lam.) Fosberg & Sachet (Apocynaceae), specimens at CGE and MANCH. The root specimen was not found.

3637. Moss, on dead cocoa nut trees, in woods of Keeling Islands—April.

Cited by Henslow (1838: 347) as '*Hypnum rufescens*', (*H. rufescens* Dicks. ex Brid., now *Orthothecium rufescens* (Dicks. ex Brid.) B.S.G.) (Hypnaceae), specimen at CGE.
An entry in the *Zoological Diary* for April 1835 describes how the land crab of the Cocos-Keeling Islands feeds on coconuts (page 362):

These monstrous Crabs inhabit in numbers the ['low' added in pencil] strips of dry ['coral' added in pencil] land; they live entirely on the fruit of the Cocoa nut tree. Mr Liesk [Liesk was temporarily in charge of the islands, while their propriator, John Clunies-Ross (1786–1854), was on a voyage to Mauritius (Hughes, 1950), next stop for the *Beagle*.] informs me he has often seen them tearing fibre by fibre, with their strong forceps, the husk of the nut. This prosess they always perform at the extremity, where the three eyes are situated. By constantly hammering the ['eye' marked out] shell in that soft part is broken ['in' marked out in pencil] & then by the aid of their narrow posterior pincers the food is extracted. I think this is as curious a piece of adaptation & instinct as I ever heard of. These crabs are diurnal in their habits; they live in burrows. which frequently lie at the foot of trees. Within the cavity they collect a pile, sometimes as much as a large bag full, of the picked fibres of the husk & on this they ['rest' marked out] rest.—

'Copied' is written in pencil in the margin. This is the last entry in the *Zoological Diary* to refer to vascular plants.]

Coralline and Other Algae

When publishing on Darwin's coralline algae collected on the voyage of the *Beagle*, the Irish botanist William Henry Harvey (1811–66, Curator of the Herbarium, Trinity College, Dublin) quoted several extracts from Darwin's notes on them. These extracts differ from the field notes on the same collections given in the *Zoological Diary*. Harvey (1847: vii–viii) acknowledged Darwin, 'for the liberal donation to our Herbarium of all those [i.e., coralline algae] which he collected while accompanying H.M.S. 'Beagle' in her voyage round the world, and for the liberty to make the freest use of his manuscript notes respecting them.'

This led me (Porter, 1985) to hypothesise that there must have been some sort of Darwin 'Coralline algae notes' in Harvey's hands when he was writing his *Nereis australis* (Harvey, 1847). When I visited Trinity College, Dublin in November 1984, Dr John Parnell, the present Curator of the Herbarium, showed me such a document that he had found in the Herbarium archives. It is in the form of a letter from Darwin to Harvey, and is printed below, with my comments, citation of specimens, and relevant extracts from Darwin's *Diary* (Barlow, 1933), the *Zoological Diary*, and correspondence. From internal evidence, the letter was written in 1842 or later. Burkhardt and Smith (1985*a*) date it 7(?) April 1847, but there is no date on the letter. A short extract was published by Sloan (1985).

Darwin wrote in his autobiography (Barlow, 1958: 77–78) that on the *Beagle*:

> Another of my occupations was collecting animals [and plants!] of all classes, briefly describing and roughly dissecting many of the marine ones; but from not being able to draw and from not having sufficient anatomical knowledge a great pile of MS. which I made during the voyage has proved almost useless. I thus lost much time, with the exception of that spent in acquiring some knowledge of the Crustaceans, as this was of service when in after years I undertook a monograph of the Cirripedia. [i.e., barnacles]

In spite of what he felt about these notes and drawings in 1876, when the foregoing was written, today's reader finds them quite helpful in understanding their importance in Darwin's evolution as a scientist. They soon become the detailed observations of a professional biologist.

Algal specimens were found only at TCD (Botany School, Trinity College, Dublin) and BM (Cryptogamic Herbarium, British Museum (Natural History)). All of the latter are duplicates of TCD collections. Most of the specimens are types of names published by Harvey. I have made no attempt to typify these names, as I am no expert on algal taxonomy. Several additional collections were cited by other contemporaries of Darwin. These and collections described in the *Zoological Diary* also are identified and discussed in this section of the paper. The colours given in Darwin's descriptions refer to those of Syme (1821). In a letter of 12 November 1833, Darwin wrote to Henslow (Burkhardt & Smith, 1985*b*: 353): 'Would it not be a good plan to send sea-weeds in Spirits, having previously noted ye colour by Werner??'

The *Coralline Algae Notes*

[page] (1

Nulliporae [underlined twice] Catalogue of Specimens, not in Spirits

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Note along left side of the page: 'Where depth not stated, are from tidal rocks.'

199. St Jago. ['J' is added over 'S'] C. de Verde's Arch.

TCD: 'Jania near J. rubens [in pencil] 199. C. Darwin St. Jago..*unique* Cape V.' The foregoing is written on the packet containing the specimen; the specimen is wrapped in paper on which is written: 'St. Jago 199 Cape Verds'. The packet bears a small, white label on which is printed '199.' Such labels were printed before the *Beagle* sailed and were to be attached to dried specimens or to the paper in which they were wrapped (Darwin, 1839: 599). The period was added in this case so that the number would not be misread as '661'.
This specimen is mounted on a sheet with nine others, including a Darwin specimen labelled 'Near J. micrarthrodia.' from King George Sound, West Australia. They are filled under *Jania micrarthrodia* Lamour. Darwin was on the island of São Tiago in the Cape Verde Islands from 16 January to 8 February 1832. During this time, he made several entries in his *Diary* (Barlow, 1933) regarding the collecting of littoral organisms.

197. do do

That is, 'ditto'; i.e., 'St. Jago. C. de Verde's Arch.'

99——do——do

These two collections were cited in the publication of *Melobesia mamillaris* Harvey, *Nereis austral.* 109, 1849, and are syntypes of that name: 'Hab. Bahia (Brazil) in tidal pools, *Mr. Darwin*, No. 3854, 3855, 3856; also Port Famine, Terra del Fuego, No. 1840, 99, 197; St. Jago, Cape Verde; Algoa Bay. *Herb. Bowerbank.* (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'. The latter indicates: 'I have it in a dried state in the Herbarium of Trinity College, Dublin, communicated by the celebrated Darwin.' Some of Darwin's comments from page four of the notes elaborated below follow Harvey's description:

In one case I found a cone (*ceramidium*) placed on one side, instead of on the summit, of a branch. The greater number of the branches have white, rounded ends, and on some of these were appearances, as if a ceramidium had once existed there, and had since scaled off. In some branches there were traces of cavities low down in them. *Colour*, on the under surfaces of the branches paler than in *Corallina officinalis*, in other parts creamy, with a tinge of flesh-red. *Darw. MSS.*

A sheet at TCD filed under *Goniolithon mamillare* (Harvey) Foslie has had the six collections pinned to it removed, with five pins and the outlines of the cards they were pinning remaining. The sheet bears Harvey's plate of the species and the annotation: 'unable to locate type H W Johansen Sept 1967'. Presumably, the specimens were lent to the Norwegian algologist M. H. Foslie (1855–1909) and were never returned (see discussion under *Darwin 3855* below). The currently accepted name for this species is *Neogoniolithon mamillaris* (Harvey) Setchell & Mason.

395. Halimeda. 20 fathoms off the Abrolhos islets, coast of Brazil

TCD: '395. C. Darwin. 20 fathoms, off Abrolhos Ids., Brazil' (two specimens). These are mounted on the same sheet as two other specimens and filed under *Halimeda opuntia* (L.) Lamour. They are not corallines, but are members of the Codiaceae (Chlorophyta). The *Beagle* was in the vicinity of the Arquipelago dos Abrolhos, 'employed in sounding & taking angles' (Barlow, 1933: 46) during 27–30 March 1832.

437. Near Cape Frio, Rio de Janeiro

This is the type collection of *Amphiroa variabilis* Harvey, *Nereis austral.* 98, 1849: 'Hab. Cape Frio, *Mr. Darwin*, No. 437. (*v.s. in Herb. T.C.D. comm. cl. Darwin*)'.
There are four mounted specimens and one packet at TCD: 'Cape Frio C. Darwin 437.'; 'Cape Frio C. Darwin 437. Amph. variabilis' (two specimens, one is annotated: 'It is *Arthrocardia* spp. probably *A. stephensoni* Mauza E. C. de Oliveira Filho 29. IV. 70'); 'Cape Frio C. Darwin 437. Amph. variabilis H' (annotated: '*Type Amphiroa variabilis* Harv. Det. H. W. Johansen Sept 1967' and 'Resembles *Arthrocardia carinata* Kg HWJ.', the latter in pencil). The packet reads: '44. Cape Frio C. Darwin 437.'

BM: 'Cape Frio, Rio C. Darwin. 437. Amph. [the latter in pencil] Ex Herb. Trin. Coll. Dublin. Recd. 1900.' The sheet is annotated: 'V. Slide Mrs Weber = Arthrocardia', 'Amphiroa variabilis Harv.', and 'Type'. It is filed with the undetermined *Arthrocardia* specimens. Under the name *Amphiroa variabilis*, De Toni (1905: 1817) cited: '*Hab.* ad 'Cape Frio' (Darwin.'

According to Darwin's *Diary* (Barlow, 1933), the *Beagle* was in the vicinity of Cabo Frio, Rio de Janeiro province, Brazil on 3 April and 5 July 1832, but he does not indicate that specimens were collected on these dates. More likely they were collected during his overland trip to the Rio Macaé between 8 and 22 April, unless they were collected by someone else on the *Beagle* and given to Darwin. This happened with geological and zoological collections, but there is no firm evidence that he did not collect all the plants himself (Porter, 1985).

595. Rio de Janeiro ['(June)' and '(1525 in Spirits of wine)' added]

Fig. 1 *Darwin 595*, syntype specimens of *Amphiroa exilis* Harvey from the Enseada de Botofogo, Rio de Janeiro, Brazil, collected in June 1832.

629. do

These two collections were cited in the publication of *Amphiroa exilis* Harvey, *Nereis austral.* 95, 1849, and are syntypes of that name: 'Hab. Rio, *Mr. Darwin*, 595, 629. Algoa Bay *Herb. Bowerbank.* . . . (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'.

There are six mounted specimens and three packets on the sheet at TCD, two specimens and one packet being *Darwin 3686*, discussed below: 'Rio C. Darwin 629.' (two specimens); 'Rio de Janeiro 629. C. Darwin'; 'Rio C. Darwin 595.' [annotated: '*Amphiroa exilis* Harv. 1847: 95 Type Det. H. W. Johansen Sept. 1967']; '595 Darwin Rio Janeiro'; 'Rio Janeiro Darwin 595.' The packets read: 'Rio C. Darwin 595.' [annotated: 'A. exilis' in pencil]; '(43) 629. Rio Janeiro Near A. Ephedra' [annotated: 'A. exilis in pencil]; 'Rio C. Darwin 629' [annotated: 'Amp. exilis' in pencil].

The sheet at BM bears two specimens and a packet: 'Rio C. Darwin 629. Amp. exilis' (in pencil); 'Rio C. Darwin 595. Amp. exilis' (in pencil). (Figures 1 and 2.) The packet reads: 'ex Hb. Hooker 1867 C. Darwin Nos. 595 & 629.' The sheet is annotated: 'Amphiroa beauvoisii'.

Darwin 595 was collected in the Enseada de Botofogo, Rio de Janeiro, Brazil in June 1832. Perhaps these specimens are those mentioned in his *Diary* entry for 8 June: 'Collected some Corallines on the rocks, which surround part of Botofogo Bay.'

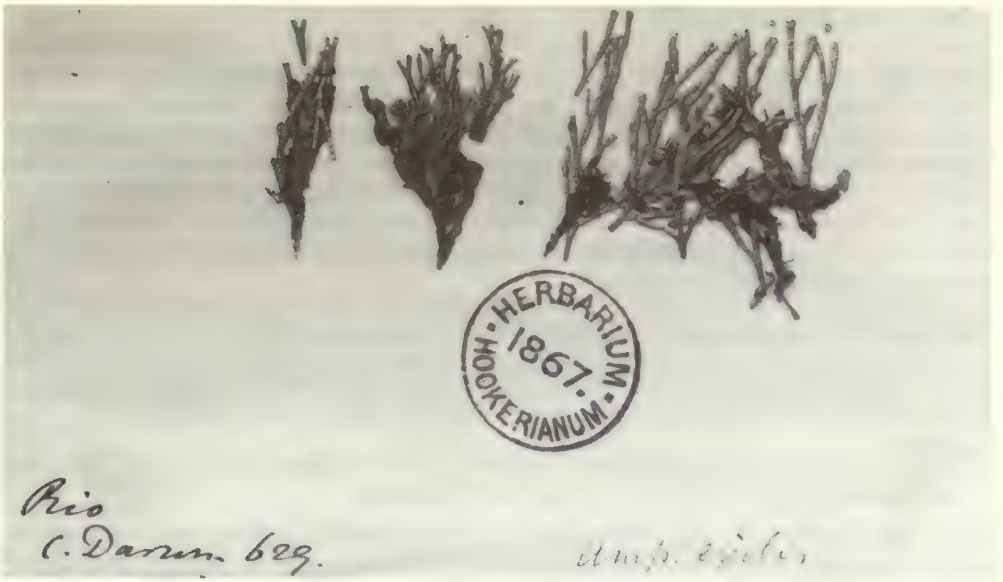

Fig. 2 *Darwin 629*, syntype specimens of *Amphiroa exilis* Harvey from Rio de Janeiro, collected in 1832.

There is a description of this *Amphiroa* on page 56 of the *Zoological Diary* (briefly paraphrased by Sloan, 1985: 99). It is indicated '*Amphiroa*', '282 Spirits', and '595', the latter added later in pencil, in the margin (i.e., number 282 preserved in spirits, number 595 dried). There is a drawing of a specimen at the beginning, and '(a)' and '(B)' in the text refer to this drawing. An '(a)' in the margin opposite the second line of text refers to footnote (a) on page 55, *verso*, which reads: '(a) 282 & (595 not spirits),' the parentheses added later. The page has a vertical line pencilled through it.

1832 June Rio de Janeiro

Branches very much flattened; formed of arched layers (a)—these are very brittle & stony & form of parallel longitudinal fibres. ['2' in margin, referring to a footnote on page 56, *verso*. See number 3686 below.]—& appear in older branches solid.—Extreme larger, white semitransparent & so soft the least touch would injure it—no trace of terminal aperature.—Joints ['(B)' added] transparent horny & ['more' added] generally at the bifurcation of branches.—['they' marked out] it would appear that these are formed rather by an alteration than continuation of central substance.—Without these joints the coralline would be rigid.—Branches irregular. generally dichotomous.—['From' marked out] The joints are formed by a crack in outer Calcareous coat. & oral opening on each side: From the side: From the these & the terminal larger being soft. as. they become, ['dry' added] they contact into hollows. V [i.e., vide] specimens (595).—I could by no means, (fresh Water, Alcohol &c). perceive any signs of irritability.—on one side of this coralline, these may be generally observed either irregularly or in in double regular rows.—rounded projecting paps.—these have a distinct minute orifice: I am at a loss what to consider. then, *by no means* could I make any animal protrude itself—These cells are not fixed deeply into the branch.—Is it impossible to be a minute Pyogoma; the occurrence in double rows on one side was against this: yet it first struck me. ['to' marked out] being case.—The Coralline is in great quantity in Botofogo Bay.—

From 'Is it impossible' to 'Botofogo Bay.' has been crossed out in pencil, and two words written over this section that I cannot decipher. At this early stage in the voyage, Darwin obviously considered these algae to be animals.

Page 63 of the *Zoology Notes* has some general notes about the distribution of corallines and other organisms on the coast of Brazil:

1832 April: May: June: Rio de Janeiro

. . . . . .

Proceeding to the Coast: the rocks, as at Bahia & other Tropical places are frequented by large bodies of Ligia [i.e., *Lygyda*, Isopoda, pillbugs]—Beneath the water are many species of Pilumnus [a genus of Brachyura, crabs].—on the Fuci [Phaeophyta, brown algae] are some Amphipoles [i.e., *Amphipholus*, Ophiuroidea, brittle stars] & many Lamodipodes.—Either from the exposed ['site' added] or [illegible word marked out] zone, there were no Stony Coralls [Madreporaria]: certainly the flexible, such as (a) Cellaria. Tertularia. Amphiroa. [then considered by Darwin to be corals, not coralline algae] were more abundant than in lower Latitudes.—

Note (a) is given on page 62, *verso*:

['(a)' in margin] I observed, cast up on the beach, those waxy looking balls. formed of flattened cells, which contain the eggs of the Buccinum. [Gastropoda, whelks]—

1392. 1393. Conferva from a smallpool on Guritti (??) Isd. Mouth of the Plata: I have some wretchedly poor notes on them, but not worth sending.

No such specimens were found. In the nineteenth century, the name 'Conferva' was used to denote any minute freshwater filamentous alga. According to his *Zoological Diary*, Darwin collected these specimens on this island off Punta del Este, Uruguay on 23 July 1833. His 'wretchedly poor notes' cover about two pages of the *Zoological Diary* in total:

[page] 201

1833 July 23d Maldonado

['*Salmacis*' in margin] Growing in abundance in pools of water. Guritti Island. colour 'sap green'.—Diameter of filament .004 or rather more. ['1392 not spirits' in margin]—length of each ['from a little' added] greater than this. to double: Very transparent containing but little internal matter.—['(a)' in margin] The spires (with hyaline globules) close. each globule however not approximate to the others. the whole being net appearance.—There were 6 or 7 spiral lines: I could only count these by observing the apparent angle one made with a transverse line & thus guess its point of reappearance on upper surface. & then noting how many lines were included in this space. ['there were about 12 Hyaline dots in one complete spire.' in margin]—In each cell about 9 lines encircled it.—The gemmules were semi-opake. dark green & slightly oval.—The tube. which connects the two ['the' marked out] filaments. was longer than that figured in Dic: class: [i.e., *Dictionnaire classique d'histoire naturalle*, Bory de Saint-Vincent, 1822–31] & not cylindrical. the central parts having a larger diameter; & evidently formed by two slightly ['funnel' added] ['cell' (?), marked out]—shaped tubes being joined.—The mark or lip. when these would arise. was visible in the cells with spiral lines of globules:—The necessity of the connection of two filaments. to produce gemmules was clearly proved by the occurrence of occasional cells with spires. surrounded by those with gemmules, & which had not, from the varying length, an opposite one to unite to.—The end of a filament would often contain gemmules whilst the other had not been joined & therefore remained in its original state.—

Note (a) is given on p. 201, *verso*:

['(a)' in margin] Having kept the plant for four days in a *dark* & warm place.—I noticed the following fact.—The gemmules are circular & much flattened. They lie on a plane in which the connecting tube is.—The stem or filament is cylindrical. In the interval of three days the gemmules had altered their position, They were now inclined in different planes, so that of course I immediately saw they were not spherical.—. I found filaments. (which appear young ones,) with the middle of each cell marked with cross lines. of a green colour & not extending whole length of cell. These cross lines were really each a part of a spire & from transparency

of stem & their shortness appear like cross lines.—They evidently [illegible word crossed out] extend till those of different cells nearly join. The number ['of these lines or vessels' added] in each cell is 7 ['∴ Not 9 as before stated' in margin]: the hyaline points have not appeared, but even then the lip, of where junction would take place was evident.—The appearance is of a set of spiral lines. alternately erased [?] for an equal length. In some specimens these lines were quite rudimentary & short & others those of two adjoining cells were almost united. Then the filament or stem must exist previously to their perfect formation.—

Both of these pages are crossed by pencilled lines. Page 201 continues:

['*Arthrodieès*' in margin] In same pool [as number 1392] there was a genus belonging to this family: joints or cells cylindrical. about 1/2 ['&' marked out] inch long & 1/18 in diameter ['1393 not spirits' in margin]; extremities rounded: it forms a trellis work. either pentagons. hexagons or square; three limbs articulating together being most common.—

[page] 202

1833 July Maldonado

['*Arthrodieès*' in margin] Limbs are ['transparent' added] turgid & elastic with water. appear to have no communication one with another: outer case colourless. no organization; is lined with ['thin' added] layer of soft tender gelatino-granular matter. which is grouped into small numerous irregular dots.—Colour pale yellowish green.—Floats on surface with the above Salmacis. in large net or trellis work pieces. severel inches square.—I know not to what family this belongs

From Darwin's description this alga appears to be a species of *Halodictyon* (Chlorophyta).

Fig. 3 *Darwin 1143*, specimens of *Corallina officinalis* L. from East Falkland Island, collected 25 March 1833.

1143 Falkland Islands ['(March)' added]

Cited by Harvey (1847: 104): 'Corallina officinalis, *Linn.* ... β. *caloclada* (Amphiroa caloclada, Dne.) ... Hab. Falklands Islands (No. 1143) and Chonos, Chiloe (No. 2423) [the latter discussed below], *Mr. Darwin* (both debilitated varieties.) Cape of Good Hope. (*v.s. in Herb. T.C.D.*)'.

The sheet at TCD bears four mounted specimens and a packet: The four specimens are labelled: 'Falkland Islands. 1143. Darwin. Corallina ['chilensis' marked out] *Dne*'. The packet reads: 'Cor. ['chilensis' marked out and 'officinalis' pencilled above it] Falklands C.D.' The latter bears a small red tag bearing the printed number '143'. According to Darwin's numbering system, red indicated 1000.

There also is a collection at BM: 'Falkland Islands. 1143 Darwin. (March) Corallina officinalis ['chilensis' marked out] *Dne*', annotated: 'T. Yendo' in pencil (Figure 3). It is filed under *C. officinalis* L.

Darwin 1143 was collected on East Falkland Island on 25 March 1833. It is described, and contrasted with number 1153, in the *Zoological Diary* as follows (page 164):

1833 E. Falkland Island

... ...

['*Corallina* (inarticulata)' in margin] This species somewhat resembles in appearance that of P (161) [i.e., page 161 of the *Zoological Diary*. The collection discussed there is number 1153; see below.]. Corall exceedingly hard stony compact; a section shows no horizontal layers & ['1153 (not spirits)' in margin] no great difference of hardness in different parts: is coated by *thin* ['coat' marked out] layer of the soft cellular tissue, of which the cells are very minute.—The covering is so thin that it a requires a microscope & lancet to procure any.—Superior surface. coloured. blackish 'crimson red': smooth very regular:—expansions. thick (about 1/10th or more) strong:—grows in large circular patches, when two interfere the junction rises in a crest; these were nearly the only ones which I could procure as specimens. Is not very common, chiefly distinguished from that of P 161. by the much greater thickness of expansions.—Amongst organized beings; few could be found, which. would show fewer of the signs of structure & life.—

['*Corallina* (inarticulata)' in margin] This. as that of P 161, ['most' added] abundantly coats the rocks or growing on itself forms bosses: in its structure it is likewise closely related, although different ['1153 (not spirits)' in margin] in external form.—Corall mamillary, composed of numerous small oblong pieces, with globular heads; these often grow into each other & are always close together. so that the surface is very irregular:—the summit of ['each' marked out and 'nearly all the' added] rounded head is marked by an irregular line or suture, as if originally formed by the

Page 165:

1833 March 27th. E. Falkland Islands

['*Corallina* (inarticulate)' in margin] junction of two pieces; colour pale with faint tint of purple.—Structure same as others, central parts of nearly uniform hardness; external coat of cellular tissue (or granules for I am not yet sure whether each ['grew' marked out] hexagon in a cell or grain) is thin, (but thicker at summits), but composed of rather larger cells, than the other species: If that of P 161 from its figure called to mind the Lichen, which grows on rotten wood; this is equally like to a dry. crumbling sort. which grows on stone.—

['*Corallina* (true)' in margin] Trichotomous, joints nearly cylindrical; those which give off branches triangular. others round; articulations semi-pellucid; colour same as usual; ['1143 (not spirits)' in margin] grows in small, low, tufts:—A longitudinal section of extreme part of ['by' marked out] limb, gives following appearance: beneath a thin transparent coat is a mass of. cellular tissue (such as so often described) & within this parallel longitudinal. darker coloured fibres surrounded on all sides by the cellular tissue: the extremities of these follow the same arched line as the external ['surface.' added] & it is probably by the successive

hardenings of these. that on occasional appearance of concentric lines is seen in a section of older ['joint' marked out] limb.—At base of ultimate limb. the outside part first becomes stony:—A Section of old limb, gives first a ['very' added] thin coat of cellular tissue. & I think an external transparent membrane.—then ['then' marked out] a semi-pellucid. hard stony case, which by the appearance in microscope appears to be part of cellular tissue of young extremity filled

Page 166:

1833 March 27th E. Falkland Island

['*Corallina* (true)' in margin] up with stony matter; the lines are rather transverse in it.—the central part. is white, softer, yet calcareous & with longitudinal lines; this is clearly the heavy fibres of extremities also hardened.—
The distinction between the central & external stony parts is best seen in the penultimate limb.—as the external case becomes perfect before the former.—The connection between the whole Coralline. must chiefly be carried on by the external soft cellular tissue: ['(Vide infra)' in margin. This section, between 'The articulations' and 'not lapidified:' is marked by a vertical pencil line in the margin.] The articulations have not much motion, & that must only be from increased elasticity: within these is a largish cavity. with arched roof & filled with a soft substance, which I imagine to be the central mass, not lapidified:—I am convinced. that it is out of the question to suppose these beings have any connection with Polypi.—What claims have they to be considered as animals?—
At the articulations the stem is contracted. & the external stony case bends in & is not continuous with that of the adjoining limb.—A Section gives the appearance of a cavity; but

Fig. 4 *Darwin 1770*, syntype specimen of *Amphiroa orbigniana* Harvey ex Decaisne from Puerto Deseado, Santa Cruz province, Argentina, collected in January 1834.

is really formed of a globular mass of tough sem-pellucid inelastic matter. This at its base unites with the central softer stony part, & above articulates into an arched cavity in the next limb:—hence motion is tolerably free.—

Pages 164 through 166 are marked through with pencilled horizontal and/or vertical lines.

1770. Port. Desire, Patagonia/['(January)—specimen 1529 in spirits' added]

Cited in the publication of *Amphiroa orbigniana*, Decaisne ex Harvey, *Nereis austral.* 100, 1847, and a syntype of that name: 'Hab. Shores of Patagonia and Chiloe, *D'Orbigny: Mr. Darwin* (1770, and part of 2423 [discussed below] (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'.
The sheet at TCD bears three specimens, two packets, and a plate, one specimen and both packets (presumably) being *Darwin 2423* (which see): 'Port Desire; Patagonia 1770. C. Darwin Amphiroa orbignyana *Dne*'; '1770. Darwin. Port Desire, Patagonia Amphiroa obrignyana *Dne*.' The sheet is annotated: 'Bossiella orbigniana (Dne) Silva (=Bossea Manza) MAP. 28 VII 57'. However, it is filled under '*Cheilosporum orbignianum* (Decne.)'. De Toni (1905: 1829) cites under this name: 'Hab. ad oras Patagoniae et insulae Chiloes (Decaisne, D'Orbigny, Darwin).' According to Smith (1969), the correct name for this taxon is *Bossea oribigniana* (Decaisne ex Harvey) Manza.
BM: 'Port Desire, Patagonia 1770. C. Darwin Amphiroa orbigynyana Dne.' Filed under '*Bosiella orbigniana* (Decne.) Silva' (Figure 4.)
Darwin 1770 was collected on the beach at Puerto Deseado, Santa Cruz province, Argentina in January 1834. See Darwin's notes to Harvey below, pp. 1–2, 6.]

Page 211 of the *Zoological Diary* reads:

1834 Jan: Port Desire

['*Halimeda* 1770 (797 Spirits)' in margin; the latter is discussed in the section on plants in spirits of wine.] Considerable quantities of this Corallina was thrown up on the beach: on each side of the [illegible word marked out] limb were little pustules; such as described P 161 [see below] & 56 [see above] They varied in number from one to four.—[when old they became white & exfoliated.—Aperture beautifully round.—When the pustules ['were broken open' added] ovules were found in three states; spherical & opake; lengthened & pointed oval. when the internal matter was clearly seen separate from the transparent case.—& 3d where this pulpy matter. was divided into distinct articulations sometimes 2, 3, or 4.—the shape of ['z' added between lines] ['articulation' marked out and 'limbs' added] even were *clearly* visible, one basal one was largest. ['(b)' in margin] the transparent case was in this case very delicate, the slightest touch rupturing it.—color dark 'crimson red.'—in short a small Halimeda ready to float forth. was indusputedly evident.—the longer limb probably becoming the point ['of' added] attachment.—As all the pieces I picked up of this Corallina were furnished with these ovules it may be suspected that the parent plant is easily torn from its root & like Fungi perishes after reproduction.—I have now seen this process in a Halimeda. Amphiroa. & one of the inarticulates.—

Note (b) is given on page 211, *verso* [Most is given by Sloan (1985: 99–100).]:

(b) This observation appears to me of considerable importance in settling the long disputed point. whether the genus Corallina belongs to the grand division of plants. or to that of animals being included in the Zoophites.—The gemmules containing several distinct articulations. I believe is entirely contrary to any analogy drawn from the propagation of Zoophites: I am ignorant. what relation it bears to any of the articulated Cryptogamic plants such as the oscillaria. [This last phrase omitted by Sloan (1985).]—But, anyhow, we should ['certainly' added] expect that one gemmule would produce only one young Polypus [i.e., polyp], ['in all Zoophites' in margin] & we might as certainly expect that each ['articulation' added] one (or pair or some definite number) would contain & be formed by a Polypus

neither of these expectations are realized in the manner of propagation of the Corallina Therefore I do not believe Corallina to have any connection with the family of Zoophites—.

Descriptions on both page 211 and 211, *verso* are marked with a vertical pencil line. Darwin was correct in describing this as a plant, but it is not a coralline, but *Halimeda*, a green alga (Chlorophyta).
He wrote to Henslow on 24 July 1834 (not mailed until 7 November) from Valparaiso that (Burkhardt & Smith, 1985*b*: 399–400):

I forget, whether I mentioned, having seen something of the manner of propagation, in that most ambiguous family, the Corallinas: I feel pretty well convinced if they are not Plants, they are not Zoophites: the 'gemmule' of a Halimeda contained several articulations united, & ready to burst their envelope & become attached to some basis. [i.e., base] – –I believe in Zoophites, universally the gemmule produces a single Polypus, which afterwards or at the same time grows with its cell or single articulation. – –

This typical venture into comparative anatomy helped convince Darwin that corallines were not corals, but this evidence came from a green alga (Chlorophyta) not a true coralline alga (Rhodophyta).

[page] 2)

1840 Port. Famine. T. del Fuego
2151. Valparaiso ['August & September' added] (abundant) [parentheses added]

Both collections were cited in the publication of *Corallina chilensis* Decaisne ex Harvey, *Nereis austral.* 103, 1849: 'Hab. Chili, *Herb. Paris.* Valparaiso (No. 2151) and Port Famine (No. 1840), *Mr. Darwin.* Norfolk Island, *Herb. Hooker.* (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'. In his discussion, Harvey (p. 104) states: 'The Port Famine specimens have a *starved* look, and probably grew near high-water mark. Those from Valparaiso are more developed, and serve for the type of the species. The plant also occurs in a mixed bundle received from Mr. Darwin and marked 'S. America.' [See Darwin's notes to Harvey below, pp. 2–3.] The Norfolk Island specimens in Herb. Hooker are slightly different.' Thus, the Valparaiso specimens (*Darwin 2151*) are syntypes, from which a lectotype should be chosen, while those from Port Famine (Puerto Sacrificios, Magallanes province, Chile) are paratypes.
De Toni (1905, p. 1842) cites '*Hab.* . . . 'Port Famine (Darwin)' under the name '*Corallina chilensis* Decne in Harv.', while Smith (1969) recognizes *Corallina chilensis* Decaisne ex Harvey.
TCD has two mounted collections and four packets on one sheet of *Darwin 1840* and what are probably unnumbered South American specimens from the bundle mentioned by Harvey in his discussion quoted above: 'S. America Corallina chilensis Darwin *Dne*' (two collections). The packets read: 'Cor. chilensis *Dne* Port Famine Darwin'; 'Corallina chilensis *Dne* [in pencil] 40 S. America C Darwin'; 'Cor. chilensis *Dne* S. America H (label lost) (40) C. Darwin'; 'Cor. chilensis [in pencil] 44 Port Famine CD (1840)'. The numbers '40' and '44', as well as '39' below, appear to be numbers assigned to the collections by Harvey.
A second sheet at TCD bears three mounted collections and a packet of *Darwin 2151.* These are filed in the type folder for *Corallina chilensis*: 'Valparaiso 2151. C. Darwin'; '39. Valparaiso. C. Darwin 2151.' (two sheets, one annotated: '*Corallina chilensis* Decaisne in Harvey Type or Isotype Det. H. W. Johansen Sept 1967'). The packet reads: '39 Valparaiso 2151. CD'.
In his *Diary* Darwin records being at Port Famine 1–8 June 1834, and at Valparaiso in August and September of the same year. The *Zoological Diary* (p. 279) adds:

1834 Aug. Sept Valparaiso

. . . . . .

['*Corallina* 2151' in margin] Examined carefully extremities of branches, they were covered by delicate membrane, beneath which ['(a)' in margin] is a cellular substance, irregularly

hexagonal. each cell had a diameter from 1/3000 to 1/4000 of an inch. These cells appear gradually to become inspissated [?] with Calcareous matter till the above structure is no longer visible In plentiful on the tidal rocks.

Note (a) is given on p. 279, *verso*:

(a) Encrusting Corallinas are present here.

A discussion of '*Corallina* 3503' from Hobart, Tasmania follows, see below.

2365. Arch. of Chiloe.

No specimens bearing this number were found. Darwin was on the Isla de Chiloé in southern Chile from 28 June to 13 July and, 21 November to 11 December 1834 and 22 January to 5 February 1835.

2423 —— ——[i.e., 'Arch. of'] Chonos (S. of Chiloe)

This was a mixed collection, as recognized by Harvey, who parcelled out the specimens into three different species. One was cited by Harvey (1847: 104) as 'Corallina officinalis, *Linn.* . . . β. *caloclada*' with *Darwin 1143* (see above under this number). At TCD there is a sheet bearing six mounted specimens and a packet: 'Chonos C. Darwin 2423.' (two specimens); '2423. Chonos C. Darwin'; 'Chonos C. Darwin 2423.' (two specimens); 'Chonos, Chiloe C. Darwin 2423.' The packet reads: 'Cor. [in pencil] 38 Chonos 2423. CD.' The sheet also has a collection mounted in the upper right-hand corner labelled: 'N. Zel. 3260'. It is not a Darwin collection. '38' presumably is the number assigned to the collection by Harvey. There is a collection at BM as well: 'Chonos. C. Darwin 2423. Cor. officinalis'. It is filed under *Corallina officinalis* L. (Figure 5.)
The second is a syntype of *Amphiroa orbigniana* Decaisne ex Harvey, with *Darwin 1770* as another

Fig. 5 *Darwin 2423*, specimens of *Corallina officinalis* L. from the Archipielago de los Chonos, Chile, collected either in December 1834 or January 1835.

(see above under this number). At TCD there are a specimen and two packets mounted on the same sheet as the latter: '2423. Chonos, Chiloe, C. Darwin Amphiroa orbignyana Dne'. The first packet reads: 'Amp. orbyniana *Dne* 37. Chonos 2423. CD.' The second bears no label. The sheet is filed under '*Cheilosporum orbignianum* (Decne.).' According to Smith (1969), however, the correct name for this taxon is *Bossea oribigniana* (Decaisne ex Harvey) Manza.

The third is the type collection of *Amphiroa darwinii* Harvey, *Nereis austral.* 100, 1849: 'Hab. Chonos, Chile, *Mr. Darwin*, No. 2423 in part. (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'. There are two collections on the sheet at TCD: '2423 Chonos. C. Darwin' and '2423. Chonos C. Darwin'. The latter consists of eight specimens; the seven on the left are labelled 'A. darwinii)' in pencil, that on the right 'A. orbigniana' in pencil. (This lower collection is annotated '*Bossiella* Det. H. W. Johansen 21 Sept 1967'.) The upper collection is annotated 'Type *Amphiroa darwinii* Harv. Det. H. W. Johansen Sept 1967'. Filed under *Cheilosporum darwinii* (Harvey) De Toni. De Toni (1905: 1829) cited: '*Hab.* ad 'Chonos' Chiloes (Darwin).'

There are two sheets at BM, both filed under *Bosiella choloensis* (Decaisne) Johansen: 'Chonos 2423. C. Darwin Amphiroa darwini H.' (annotated: 'Cheilosporium darwinii (Harv.) De Toni' in pencil); 'Chonos, Chiloe 2423. C. Darwin Ex Herb. Trin. Coll. Dublin. Recd. 1900.' The latter is annotated: 'see slide' and 'V. slide by Mrs. Weber' by Antony Gepp (1862–1955, handwriting kindly identified by James Price) and 'It seems impossible that the slide was prepared from this specimen. G. T. [Geoffrey Tandy 1900—] 1935', 'Amphiroa darwinii (Ag. 16a)', 'Lithothrix aspergillis', 'Cheilosporum (Amphiroa) darwinii (Harv.) De Toni', and 'Isotype—type in TCD H W Johansen Sept 29, 1967'. Gepp and Tandy were cryptogamic assistants in the British Museum (Natural History) herbarium (Stearn, 1983).

The *Beagle* was sailing through the Archipiélago de los Chonos, in southern Chile, in December 1834 and January 1835.

2478. ———[i.e., 'Arch. of'] do [i.e., 'Chonos'] do [i.e., 'S. of Chiloe']

Cited by Harvey (1847: 110) as 'Melobesia polymorpha, *Linn.* . . . Hab. . . . Chonos, *Mr. Darwin*, No. 2478? (*v.s. in Herb. T.C.D.*)'. I found no such specimen.

3503. Hobart. Town. ['February' added] V. Diemen's Land.

I did not find any specimens bearing this number. Darwin was in Tasmania 5 to 16 February 1836. The collection is discussed by Darwin on pp. 3–4 of his notes to Harvey below.

3557. 3558. ['(March)' added] 4 or 5 species King George's sound; Australia

As indicated by Darwin, several species are included under this heading. No specimens could be positively identified as *Darwin 3557*, although one cited below may be this. Those listed as *Darwin 3558* are cited alphabetically following the name applied to them by Harvey (1847).

The first (Harvey, 1847: 96) was 'Amphiroa stelligera, *Lamour.* . . . Hab. Australia and Tasmania. Common. King George's Sound, *Darwin*, No. 3558. (*v.s. in Herb. T.C.D.*)'. Mounted on the same sheet as four other collections and a plate at TCD is 'King George Sound 3558. C. Darwin'. The sheet annotated: '*All* specimens on this sheet are *Metagoniolithon stelliferum* (Lamarck) Weber-van Busse This includes the specimens C. Darwin 3558 Mrs. Mallard Port Phillip and ex Herb Areschoug, Port Phillip. S. Ducker 1/5/1979'. According to Ducker (1979), the correct name for the taxon is *Metagoniolithon stelliferum* (Lamarck) Weber-van Busse.

The second (Harvey, 1847: 105) was 'Jania rosea, *Dne.* . . . Hab. Coast of Australia. King George's Sound, *Mr. Darwin*, 3558 &c. (*v.s. in Herb. T.C.D.*)'. Filed under *Corallina chilensis* Decaisne ex Harvey and *C. cuvieri* Lamour at TCD is 'King George's Sound. 3558. C. Darwin.' A non-Darwin sheet at BM is annotated: 'I consider *J. cuvieri* & *J. rosea* to be the same. WHH [i.e., William Henry Harvey] 1857.' Underneath this in pencil is written: 'No. T. Yendo'.

The third (Harvey, 1847: 106) was 'Jania tenuissima, *Sond.* . . . Hab. . . . King George's Sound, *Darwin*, No. 3558 (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)' TCD: 'King George's Sound. 3558. Darwin. Jania tenuissima Sond' (the latter in pencil), on a sheet with four other collections; 'Near J. micrarthrodia [in pencil] 42. K G Sound C. Darwin', in a packet on a sheet with nine other collections, including *Darwin 199*, discussed above. Both sheets are filed under *Jania micrarthrodia* Lamour. '42.' presumably is the number assigned to this collection by Harvey.

A collection thay may prove to be *Darwin 3557* was cited by Harvey as a new species: *Melobesia darwinii* Harvey, *Nereis austral.* 109, 1849, 'Hab. King George's Sound, *Mr. Darwin.* (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'. I found no such specimen, which would be the type of this name. Cited as '*Lithothamnion darwinii* (Harvey?) Aresch.' by Harvey (1863: xxx: 'Hab. King George's Sound, *C. Darwin.*') and as '*Lithophyllum darwinii* (Harv.) Fosl.' by De Toni (1905: 1781: 'Hab. in "King George's Sound" Novae Hollandiae (Darwin).'). Perhaps like number 3856 (see below), it was sent to Foslie and never returned to Trinity College, Dublin.

The *Beagle* was at King George's Sound, Western Australia, 6 to 14 March 1836. Darwin wrote of this place in his *Diary* (Barlow, 1933: 391): 'We staid there eight days & I do not remember since leaving England, having passed a more dull, uninteresting time.' Collection 3557 is described on p. 161, *verso* of the *Zoological Diary*:

(z) On tidal rocks at King. George's Sound. found a Corallina ['3557' in margin] growing in nodules to a Granite rock: color such as is universal to the family in the Atlantic & Pacifick oceans. in T. del Fuego & Australia: consists of numerous, stony, cylindrical, inarticulate parallel small columnes, partly adhering one to the other. Many of them show an obscure globular. necklace like structure. centre of each column. white,.—some of the smaller & irregular arms. were covered on all sides by the generative bladders. These in every respect resembled. those already described: the older ones scale of [i.e., off], ['with' marked out] in form of an irregular particles of white crust.—Size of each pap or bladder rather more than the span of 1/100th of inch & the circular aperture has a diameter a shade larger than 1/1000. of inch.—I was not fortunate enought to extract an ovule: This ['sp' marked out] Corallina is evidently a connecting species, most closely allied to the division of Inarticulata.—[presumably a group of Cnidaria, coelenterates]

['*NB.*' in margin] I saw in a delicate transparent. articulate Corallina, than [i.e., that] the branch appeared to be composed of several, ['3557.' in margin] hollow, transparent ligamentous vessels, which in the solid parts between the articulations were filled up with Calcareous. granular matter.—Species with flattened joints. & symmetrical lateral branches

I am unable to determine which species is being described by Darwin. There is a vertical and a horizontal line drawn through this page.

3251. Galapagos Arch. 12 fathoms

Cited by Harvey (1847: 110) as 'Melobesia clacarea, *Ell. & Sol.* ... Hab. ... Galapagos, in 12 fathoms, *Mr. Darwin*, No. 3251. (*v.s. in Herb. T.C.D.*)'.

I did not find any specimens bearing this name or locality. It was cited by Harvey in his *Phycologia britannica* (1846–51, pl. CCXCI: 'Probably widely dispersed; I have specimens from New Zealand (*Dr. J. D. Hooker*), and the Galapagos Group (*Mr. Darwin*).') and by De Toni (1905: 1745) as '*Lithothamnion calcareum* (Ell. et Sol.) Aresch..' ('*Hab.* ... insulasque Gallapagenses (sec. Harvey).'). This taxon is not reported from the Galápagos Islands by Silva (1966), who states (p. 149): 'The earliest recorded seaweed from the Galápagos Islands is an encrusting coralline alga dredged from a depth of 12 fathoms by the 'Beagle' and sent by Darwin to Harvey, who identified it (almost certainly in error) with a European species.' Darwin was in the Galápagos Islands from 15 September through 19 October 1835.

On page 335 of the *Zoological Diary*, Darwin added some information on the algae in a discussion of the endemic marine iguana (*Amblyrhynchus cristatus*):

['Ambly *Rhyncus*' in margin] ... I opened the stomach (or rather duodenum) of. several, it was largely distended by quantities of minced pieces of sea-weed. of that kind. which grows in *this* foliaceous expansions of a light green & dull red color.— ..... I conceive the largness of the intestine is in perfect agreement with its herbivorous appetite.—Capt Colnett states [Colnett, 1798] they go out to sea in shoals to fish: I cannot believe this is the object. Nor is it very clear what their object can be.—Does such sea-weed grow ['(B)' in margin in pencil] more abundantly a little way from the coast? ['B' added in pencil]

Note (B) is on p. 335, *verso*:

(B) Does not the Manatee ['of the West Indian ocean' added] feed on such seaweed? [note added later in pencil]

3638. [underlined in pencil] Halimeda & Nullipora, tidal coral reefs, Keeling Atoll, Indian Ocean

TCD: 'Tidal Coral Reef, Keeling 3638. C. Darwin.', three specimens. These are mounted on the same sheet with three other specimens, which is filed under *Halimeda macroloba* Decaisne. They are not corallines, but members of the Codiaceae (Chlorophyta). No corallines were found bearing this number. The *Beagle* was at the Cocos-Keeling Islands from 1 to 12 April 1836.

3686. Cape of Good Hope

Cited in the publication of *Amphiroa exilis* var. *crassiuscula* Harvey, *Nereis austral.* 95, 1849, and the type of that name: 'Var. β. *crassiuscula* . . . Hab. . . . β, Cape of Good Hope, *Mr. Darwin*, No. *3686*. (*v.s. in Herb. T.C.D. comm. cl. Darwin.*)'.
There are two mounted collections and one packet on the sheet at TCD: '3686. Cape. C. Darwin' (two specimens, one annotated: '*Amphiroa exilis* var β *crassiuscula* Harvey 1847:95 Det. H. W. Johansen Sept 1967'). The packet reads: '3686. C. Darwin Cape of Good Hope'. The sheet is annotated in pencil: '3686. Fragments of a specimen (remainder lost) growing abundantly on an Ascidian cast up on the beach at the C. of Good Hope *June*. MS. in Darwins autograph in Herb. TCD.' This is a quote from page one of Darwin's notes to Harvey, discussed below.
There is one specimen at BM: '3686. Darwin Cape of Good Hope Presd. by Trinity College Dublin per. Prof. Perceval Wright 9.1.95.' (Figure 6.) Annotated in pencil: 'Amphiroa (exilis var. crassiuscula Harv.) beauviosii Lam.']

Fig. 6 *Darwin 3686*, isotype specimen of *Amphiroa exilis* var. *crassiuscula* Harvey, collected at the Cape of Good Hope, probably at Simon's Bay, Republic of South Africa, in June 1836.

Darwin 3686 was collected at the Cape of Good Hope, Republic of South Africa in June 1836. The *Beagle* was at anchor in Simon's Bay from 31 May through 18 June, and the specimens probably were collected there. A note on p. 56, *verso*, of the *Zoological Diary* describes this collection:

['(*z*)' in margin] Corallina growing abundantly on an mass of Ascidia [Urochordata, a tunicate] thrown up on a beach. June 1836. C. of Good Hope.—By accident ['3686' in margin] nearly all the specimens were lost, the fragments preserved showed on many of the cylindrical joints, the small pap, formed bladders, with little circular orifices. Being broken open. beneath the microscope, there were seen 8–12 (about) small rather light pink bodies, arrayed in a ['sort of' added] ring in a little flocculent matter; by a slight motion were easily detached & floated separately,—in form pear shaped [pencilled drawing in margin], one side rather protuberant, ['apex' marked out] one extremely pointed, the other rounded; the envelope was distinct, the central matter appeared granular & pink coloured. In size they could easily pass through the orifice of cell.—With 1/20" focal lens. could perceive no particular organization in these ova.—I examined & opened several of the paps.

3854. 3855. [numbers underlined in pencil] Bahia Brazil in tidal pools ['(August)' added]

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3856. I believe same species. Bahia

Cited by Harvey in his publication of *Melobesia mamillaris*, these collections are syntypes of that name (see discussion under numbers 197 and 99 above). I did not find any of the syntypes cited by Harvey. However, they may be in the herbarium of Michael Heggelund Foslie (1855–1909), Museum of the Royal Norwegian Society for Science and Letters, Trondheim. A catalog of his herbarium (Adey & Lebednik, 1967: 26) lists: 'Darwin, Brasil, Bahia, no. 3855 (marked *Melobesia mamillaris* Harv.)'. It may be that this and the other Darwin coralline specimens cited by Harvey that I did not find at TCD were lent to Foslie and were not returned following the latter's death in 1909. Numbers 3854–3856 are described below on pp. 4–5 of the notes to Harvey. The *Beagle* returned to Bahia in August 1836, and Darwin records being there from the first through the sixth. These specimens are described in the *Zoological Diary* (p. 367):

1836 August Bahia Brazil (367

['*Corallina* 1463 *spirits* 3854: 55 56' in margin] This species is very common encrusting the smooth surfaces of the ['granitic' added] rocks in the tidal pools.—Its colour on [changed from 'in'] the under surfaces is rather paler than that of Corallina officinalis. but generally it is cream-coloured. with a tinge of flesh-red.—The extremities of the short rigid branches (in 463). [The latter is discussed in the plants in spirits of wine section of this paper.] are either rounded & white or acuminated into a cone. In this latter case the summit is surmounted by a perfectly circular minute orifice, which leads by a short cylindrical ['tube' added] into a circular cavity. occupying the base of the cone. [Drawings in margin.]—['The structure of the branch shows ('by'? marked out) retangular intersections of concentric with vertical plates. & the cavity does not appear to lie conformably with these plates.—'marked out in pencil] On breaking off the terminal cone, the cavity is seen to be occupied by a white mass. which from the disturbance ['has' marked out] appears like an intestinal mass. [It [bracket in original] is found to consist of from 20–40 separate cylindrical bodies attached by the lower extremities & embeded in a pulpy matter; ['which' marked out and 'they' added] are placed in a vertical & nearly parallel position.—These occur ['+' added] in the same cavity, *in several* [underlining in pencil] *states*; some consist of a simple elongated sack with ['a little' added] granular matter. which presently assumes ['two' marked out] one or two obscure [illegible word marked out and 'circular' added] contractions.—But the greater number & most perfect ones, are in dimensions 3/500th long & 1/500 broad [changed from 'broard']; under the

Page 368: Bahia. Brazil 368

['*Corallina*' in margin] microscope. they are seen to consist of an envelope ['containing' marked out and 'full of' added] a pale brown granular matter. The envelope has a necklace form. owing to three ring-like contractions. ['partially' added] dividing the little cylinder into four beads. [Drawing in margin.]—These contractions, do not appear to form true articulations, for they are far. from separating the internal granular matter:—At the lower end. the terminal [illegible word marked out] lobe has a point or navel of attached flocculent granular matter: the superior lobe is generally rather larger & more elongated than the others.—These articulate-like contractions. in the most perfect ['bodies' added] amounted to three, but in the less developed were two & even one; & lastly as I have said. an obscure sack can alone be distinguished in the enveloping matter.—I conceive these are the gemmules or seeds.—In one case. I saw one of these cones ['placed' added] on the side. but near the summit of a branch.—['Many of' marked out] The greater number of the [changed from 'these'] ['terminal points' marked out and 'extremities of the branches' added] are white & rounded. ['Are these' marked out] Have the cones been removed from these? I am inclined in some cases to think so, from marks of a slight depression & a scaling ['appea' marked out] structure. which appears general manner of healing.—I saw in section of some branches. the trace of an obliterated cavity.—

Both of these pages have a vertical pencilled line through them.

3857. Bahia: ['B' is written over 'A'] a distinct & very common species, coating smooth surfaces in tidal pools: colour much darker

Cited in the publication of *Melobesia scabiosa* Harvey, *Nereis austral.* 110, 1849, and the type of that name: 'Hab. On stones, at Bahia, *Mr. Darwin.* No. 3857 (*v.s. in Herb. T.C.D.*) 'A distinct and very common species, coating smooth surfaces in tidal pools: colour darkish. '*Darw.*' Cited by De Toni (1905: 1748) as '*Lithothamnion* ? *scabiosum* (Harv.) Fosl. . . . *Hab.* in lapidibus probe Bahiam (Darwin).' I did not find any such specimens.

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The bundle marked S. America, has been injured & labels washed off; but they all come from S. America.

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This must be the source of the specimens of *Corallina chilensis* labelled only 'S. America' mounted with *Darwin 1840* from Puerto Sacrificios, Chile. They perhaps were wetted in the storm that almost swamped the *Beagle* off Cape Horn early in 1833, described by Darwin in a letter of 11 April to his mentor Prof. Henslow (Burkhardt & Smith, 1985*b*: 306):

It is now some months since we have been at a civilized port, nearly all this time has been spent in the most Southern part of Tierra del Fuego.——It is a detestable place, gales succeed gales with such short intervals, that it is difficult to do anything.——We were 23 days off Cape Horn, & could by no means get to the Westward.—The last & finale gale, before we gave up the attempt was unusually severe. A sea stove one of the boats & there was so much water on the decks, that every place was afloat; nearly all the paper for drying plants is spoiled & half of this cruizes collection.

Specimens in Spirits

No specimens preserved in spirits were found. Either those at TCD were destroyed (there is now no spirit collection of algae there), or they were sent elsewhere. If at BM, they are not listed in the catalogue to the preserved algae collections.

Nor. 1525 ['282' marked out]——Rio de Janeiro

Cited above under number 595; presumably also *Amphiroa beauvoisii*.

„ 77. St. Jago. C. de Verdes
„ 585. Falkland Islands

Page 4, although not so numbered:

1529—Nullipora. dark crimson-red. Port Desire Patagonia

Cited above under number 595; presumably also *Bossea oribigniana*.

1463. ['August' added] Bahia Brazil (2 species)

Cited below with numbers 3854, 3855, and 3856; presumably also *Melobesia mamillaris*.

1464. do Halimeda (tidal pools)

C. Darwin [signed]

N.B. Should you wish to know in what month any of these specimens were collected I can tell you.——

The next six pages of the manuscript consist of notes on some of the collections enumerated in the foregoing list. By and large, these notes are derived from the *Zoological Diary*. However, a comparison of these notes with those of the *Zoological Diary*, which are printed above, will show that they have been edited, sometimes severely.

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3686X [Marked out by pencil, and 'Amphiroa (pustulata) exilis' added above by Harvey.] Fragments of a specimen, (remainder lost) growing abundantly on an Ascidia cast up on the beach at the C. of Good Hope. *June*. [1836] The small pap-like bladders contain from about 8 to 12 small, rather-light-pink, ['ovules' marked out and 'spores' added], arranged irregularly in a ring in flocculent matter : by a slight motion were easily detached & floated away : in shape like a pointed pear, with one side a little potruberent, one end pointed, one rounded. They were small enough to pass through the circular orifice of the little bladders.—

The type of *Amphiroa exilis* var. *crassiuscula* Harvey.

1770 & (1529 spirits) Considerable quantity found cast up on beach of P. Desire [Puerto Deseado, Argentina] in January. [1834]—Apertures of bladders beautifully round : when broken open, the spores were found in three states. 1st spherical & opake, 2d lengthened, pointed oval & with the external tunic very distinct, 3d divided into, two, three or four ['articulations' marked out and 'segments' added] which in some degree seemed like the ['articulations' marked out and 'segments' added] of the parent-plant; the ['arti' marked out] segment at one end was longer than the others [& I supposed became the point of attachment, but Hooker tells me that this is all mistake.] : [Brackets in original; 'Hooker' was J. D. Hooker, now Assistant Director of the Royal Botanic Gardens, Kew.] the spores in this third state were dark crimson-red, & the case enclosing them was very delicate being ruptured on slightest touch. It struck

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me with much surprise, that every specimen I picked up was well furnished with the spores, & as these had all been washed on shore & torn from their points of attachment, I suspect that there is some connection, between spore-bearing & easy detachment.] [Bracket in original.]

These are specimens of *Bossea oribigniana* (Decaisne ex Harvey) Manza, number 1770 being a syntype of this name.

At the Falkland isld. (March) [1833] I found three apparently ['distinct added] species of encrusting lichen-like Nulliporae, ['of' marked out] which are lost, or rather, as ['believe' marked out and 'I am almost sure' added], from the contents of the parcel marked outside 'S. America', of which the labels have been ['lost' marked out and 'washed off' added]. [in storm?, see above] Although I observed a multitude of specimens, I found only *one* bearing the ['spore-' added] bladders these contained ['each' added] from 30 to 40 either spherical or oval semi-opake spores, slightly coloured, & 1/500 of inch in diameter. These spore-bladders seem never formed on the growing margin. They seem to arise by a separation of the stony layers, which appears to be [changed from 'to'] pushed up from below, & at first there is no aperature : when ['an' added] aperture is first seen it is small, but afterwards increases in diameter to 1/500 of inch. ['When the' marked out and 'After' added] spores ['are formed, a cavity (changed to 'concavity') has been for corroded in the stony layer' marked out] are expelled, the

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little bladders become white & exfoliate & the concavity in which the spores rested gradually becomes filled up to the general level : a series ['of sp' marked out] showing this gradual obliteration of the ['spore' added] bladders, ['& the refilling of the concavity' added] was [? 'as' marked out] very evident.

This is *Darwin 1153*, presumably *Amphiroa exilis* Harvey, which is described in much greater detail in the *Zoological Diary*. Page 161 of the latter begins:

1833 March 25th. E. Falkland Island

['*Corallina* Linn: (inarticulate) 595 & 1153 (not spirits)' in margin] Coralline. stony. brittle ['inarticulate' added] encrusting rocks & sending forth *lichen*-shaped ['thin' added] expansions.—Growth concentric, shown by concentric, shown by lines & changes in the tint of colours; Colour darkish 'crimson red' or that of Corallina officinalis: a section shows, that the superior part is composed of horizontal layers of a stony. & slightly coloured substance.—the other softer. white. ['(b)' in margin] & of a more granular nature:—the inferior surface is rougher (for attachment) & paler ['(z)' in margin; this is a note for number 3557 (see above)] coloured than the upper: the border or extremity of the expansions is thickened; edges ['semi' added] pellucid. covered with a delicate transparent membrane. & containing a soft ['granular' added] cellular tissue; in all these ['latter' added in margin] respects; the similarity of this with Corallina & its subgenera is very great.—On the superior surface. & in the more central parts, one some pieces ['(a)' in margin] there are numerous. small cones or paps, with a minute circular orifice at the summit.—They precisely resemble those described at P 56 in an Amphiroa.—[These [bracket in original] cones are formed ['in any point' in margin] by a separation, ['in middle' added] of the ['superior' marked out] stony layers; & the upper part gradually assumes the conical shape—

Notes (a) and (b) are given on page 161, *verso*:

(a) The ovule-bearing cones are very uncommon; I only found one specimen with them. & out of many cones. which I examined only three had the regularly formed ovules: the rarity of this generation process may perhaps ['X' in margin] explain the general ignorance of method of propagation in Corallina.—
(b) For similar particulars, in an Halimeda V 211 [i.e., see *Zoological Diary*, page 211]

Page 161 continues [From 'If the cone' to 'laterally' on page 162 is quoted by Sloan (1985: 99).]:

At first they have no aperture:—when it first appears it is small; but in times increases to a diameter of 1/500th of inch; after this epock, the cone becomes white & brittle & its surface exfoliates.—the concavity. on which the younger ones rest. is partially filled up & it is clear the little cone has performed its office in the economy of nature.—] [bracket in original] If the cone is removed in one of the early ones, the bottom is concave & on it there is a layer of the pulpy cellular

Page 162 continues:

1833 March E. Falkland Island.

['Corallina' in margin] tissue or granular matter, such as occurs at the extremities of the branches.—this lies on ['(z)' in margin] the white softer substance of the Corall.—so that the stony layers are perforated.—At a later age. the granular matter is collected into [semi-opake. [bracket in original] spherical or oval balls ['bulbs' in Sloan (1985:99)], with a transparent case: they [changed from 'these'] are slightly coloured & between 30 & 40 in number.—in diameter 1/500th of inch.—] [bracket in original] They are ovules & the cones ovaries.—The simplicity of this generative process is shown by its ['the' marked out] similarity to ordinary growth.—the external border is *thickened* composed of precisely a similar substance & enveloped in a transparent membrane; it may be considered as formed by a juxtaposition of cones, or rather the cone & ovules owe their origin to the creative power acting on a point. ['(a)' in margin] where the growth or extension cannot take place, hence the granular matter is enveloped in a spherical case & seeks an exit through the stony layers, instead of increasing laterally.—In some specimens these cones were absent; in others there were white spots. with the surface exfoliating. & then I imagine cones to have exsisted.—the Corall abundantly coats the rock. in the pools left at low water. According to Lamouroux [Lamouroux, 1821] it would be in the III Low [?] Ordres. Corallimnes inarticulees; but from the description of genus Udotea it cannot belong to it. [Sloan (1985: 100) quotes this entry from here to 'Lichens.' on page 163.]—Upon reading over description of Amphiroa P 56. [i.e., *Zoological Diary*, page 56] it will evident how very close a relationship, in manner of growth & cones no more [i.e., no more on this page; the description is continued below]

All the above pages are marked or marked out with pencilled lines. Presumably, this indicates that Darwin used them in writing his notes for Harvey. He often marked passages in the *Zoological Diary* in this way when the information was used for other manuscripts.
Notes (a) and (z) are given on page 162, *verso*:

(a) It is to be remembered. that the cones do not occur near the margin. where the ['X' in margin] Corall is growing.— (z). [This note is quoted in Sloan (1985: 105).] Decandoelle & Sprengel. Botany. P. 92. [DeCandolle & Sprengel, 1821] Consider that propagation in Lichens & Confervae is a kind of budding & not true generation. In Halimeda such certainly I think is the process.—['x in the Inarticulata' in margin] In the method described in Corallina of Hobart town of the extremities of branches. being 'laid' as branches of trees, & when from the foliaceous expansion buds appeared. perhaps in this method we see the only

kind of propagation known to those genera. ['this genus' in Sloan (1985)] in which the bladder-formed cones. have not been discovered.—

Page 163 continues:

1833 March E. Falkland Isd

['Corallina (inarticulata)' in margin] there exists between that Coralline & this. The absence of articulations is the chief difference: I think we may hence expect that the propagation in the whole family Corallinae will be somewhat similar to the one described.—I have never been able to perceive any Polypus or true cell. & till I do I must rank these beings as belonging to the Vegetable rather than animal world.—the simplicity of the reproduction would seem rather to favor this idea.—I suspect the strongest argument against it. is ['the' marked out and 'a false' added] analogy of form with respect to Corallines; in this case however there is a stronger one to Lichens.—

3503 Feb. 36. [1836] Hobart Town. [Hobart, Tasmania] On lifting up a fragment of sandstone which had lately fallen into a tidal pool, I found some branches of this Nullipora attached to its lower edge. These branches had been broken off by some violence from their parent tufts, & the terminal segments or ['of' in Sloan (1985)] joints having been pressed by the stone had adhered to it & ['and' in Sloan (1985)] expanded. These little foliaceous expansions had exactly the same appearance as the first growth of the [this word not in Sloan (1985)] encrusting Nulliporae; but from them, little buds were springing, evidently destined ['determined' in Sloan (1985)] to be branches, & thus to form a new tuft. [Quoted from 'On lifting' to here by Sloan (1985: 104–105).] Thinking that this manner of propagation, (comparable to laying trees), was solely the effect of the stone having accidently fallen on lately detached, loose branches, I examined some vigorous tufts still attached to the rocks, & in them I found a few of the lateral branches, with their heads drooping outwards & with

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the terminal segments attached to the surrounding rocky surface & forming little expansions, whence new branches were to spring. Hence this Nullipore increases like a banyan tree. Is it not rare to find spores on the *cylindrical*-articulated Nulliporae? & may not this method of propagation partly explain it, in same manner as ['tr' marked out] plants that propagate freely by runners seed badly???—

1463 spirits (3854, 3855, 3856 doz [?]). This ['*Melobesia mamillaris*, Harv.' added between the lines by Harvey] species is very common, encrusting the smooth rocks in the tidal pools (August) [1836] at Bahia in Brazil. The branches are short & rigid; colour on the under surfaces paler than in Corallina officinalis, ['&' marked out] & in other parts [changed from 'patts'] creamcoloured with tinge of flesh-red. The extremities of the rigid branches are either rounded or acuminated into a cone. In this latter case, the summit is surmounted by a circular minute orifice, leading by a short cylindrical canal into a little chamber. In this chamber there ['is' marked out] are from 20 to 40 cylindrical spores, standing vertically & nearly parallel, & embedded at their lower ends in pulpy matter. These spores occur in several states, 1st as ['a' marked out] simple elongated cylindrical sacks, containing granular matter, 3/500 long & 1/500 broad. 2d. these become

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marked by one or two obscure constrictions, which finally become plain & are three in number, dividing the cylinder into four bead-like bodies. The upper lobe is generaller larger

& more elongated than the others. In one case, I found a cone placed on one side, instead of on the summit, of a branch. The greater number of the branches ['are' marked out] have white, rounded ends, & on some of these there were appearances, as if a cone had once existed there, & had since scaled off. In some branches there were traces of cavities lower down in them.

These specimens are syntypes of *Melobesia mamillaris* Harvey.

On several occasions having kept vigorous tufts of articulated Nulliporae in sea-water in sun-light, it appeared as if a good deal of gas was exhaled; it wd. be curious to ascertain what this is. [It would be oxygen.]

In my work on 'The Structure & Distribution of Coral Reefs'. [Darwin, 1842] p. 9. ['(& p. 24, 42,' added] I have described briefly these species of Nulliporae, which are very interesting from the part they play in the formation or rather preservation of the Coral-reefs; [On pages 9–10, 24–25, and 42 of *Coral Reefs*, Darwin discusses coralline algae he observed in the Cape Verde Islands, Cocos-Keeling Islands, and Tahiti.] they growing exactly above the level, at which true corals

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are unable to live: they form a solid mass three feet thick. Most unfortunately I have given the specimens to the British Museum, (forgetting that they were undescribed) together with a suite of specimens, exhibiting the formation of coral-reefs. [The corals are at the British Museum (Natural History); I did not find the coralline algae there. Some of the corals were illustrated by Whitehead and Keates (1981).] Should you [i.e., Harvey] be coming to London in the course of a few months, I hope you will enquire for them, & just look at what I have said about them. But if you are not coming to London & *think it worth while*, [emphasized by underlining with two lines] I would write to the Trustees, for the chance (I think a likely one) that they would let me have them out to lend you.—[Specimens were not lent for identification until 1902 (Stearn, 1983).]

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p. 86. [in Darwin (1842)] *Note*. in my work on Coral Reefs I give the ['greatest' added] depths at which I found any Nulliporae, & some facts on their abundance in several quarters of the World.—N. B. in this note, when I speak of 'Halimeda' it wd. ['have' added] been safer if I had said *flatly* articulated Nullipora, for I then thought such Nulliporae as (1770) were Halimedas.

Indeed, it is *Bossea oribigniana* (Decaisne ex Harvey) Manza.

Other algae collections made by Darwin on the Beagle *and reported in the literature.*

A reading of Darwin's *Plant Notes* (DAR deposit) and *Zoological Diary* (DAR 30, 31) shows that he collected a number of other algae besides the corallines discussed above. However, only a few of them have been mentioned in the literature, and I found none at Cambridge University, Trinity

College, Dublin, or the British Museum (Natural History). Either they are housed elsewhere, which is unlikely, or they deteriorated after being collected and were discarded by Darwin or others. It may be that they remain hidden in one of the three depositories, waiting to be found in the future by some dusty prober looking through the exsicattae. Those that have been published follow, arranged alphabetically by division, and then by genus and species.

Chlorophyta

Caulerpa webbiana Montagne (Caulerpaceae). Reported from the Brazilian island of Fernando Noronha by Hemsley (1885: 29) as collected by '*Darwin.*' Hemsley (1885: 9) stated that Darwin 'dried specimens of about a dozen of the plants met with, which he gave to the late Professor Henslow. They are now in the Herbarium of Cambridge University, and through the kindness of Professor Babington [Charles Cardale Babington (1808–95), Henslow's successor as Professor of Botany] we have been able to examine them.' The collection should be at Cambridge.

Chlamydomonas nivalis (Bauer) Wille (Chlamydomonadaceae). Darwin (1839, 1845) discussed (as '*Protococcus nivalis*') this wide-spread alga known as red snow. The published version is much shorter than the extensive notes in the *Zoological Diary*, which begin on page 319:

> March 20th. 1835. = Red Snow. =
>
> In the road from St Jago [i.e., Santiago] de Chili to Mendoza [Argentina] by the Portillo pass there are two distinct Cordilleras or ['chains' marked out] lines of mountains. In both of these ['ridges' marked out] at their Eastern & Western slope the road passes over ['large' marked out] masses of perpetual snow.—on these I noticed much of the substance called 'red Snow.' The elevation as calculated from Humboldt. is given in Mr Caldcleughs travels [i.e., Caldcleugh, 1825] as 12800 ft.—Mr. Miers (in his account of the passage of the Andes) [i.e., Miers, 1826] mentions seeing both Red & Green Snow. ['?' marked out] in the [two illegible words, one above the other, marked out] ['frequented' marked out] pass of the ['Uspullala' marked out and 'Uspullata or' added] Las Cuevas: He states no particulars.— ['I was not fortunate enough to meet with it in the' marked out] At the time of year I passed (April 5th). [1835] there was scarcely any snow on this road.—I first noticed the Red Snow. by the color of the impression of Mules hoofs; ['as if they had been slightly bloody' added] also in ['in' marked out] some places when the Snow was thawing ['very' marked out and 'very' again added] rapidly. The color is a fine rose with a tinge of brick red.—The surface of the Snow ['is scattered over' marked out] as seen from the [illegible word marked out] mules back to be ['appears' added] scattered over with bits of dirt. My first idea. was. that it was the dust of the red Porphyria, blown. by the strong winds from ['one' marked out and 'crumbling' added] sides of the Mountains.
>
> Page 320 continues:
>
> The particles look as if ['they' marked out] many were 1/10th of inch in size. This is an optical deception, owing to the magnifying powers of the ['course' marked out and 'large' added] crystals of Snow. Hence on being taken up the particles ['go' marked out] almost disappear. This [changed from 'These'] Snow ['being taken up &' marked out] crushed between the fingers or on paper communicated a red tinge, but otherwise ['as I have said' added and 'as I have' marked out] with the exception of a few places the Snow, before ['mechanical violence' (?) marked out and 'pressure' added] is not coloured.—Examining ['& with a weak pocket lens' added and 'the Snow, on which such (illegible word) particles, appeared to have adhered:' marked out] groups ['(from 10–40)' added and 'of minute spheres' marked out] ['of most' added]!. minute circular atoms were clearly visible. ['They' marked out and 'Each' added] was perhaps ['about' added] 2-[illegible number] diameters apart from the others.—These These groups caused the appearance of such course particles.—I placed some of them between the leaves of my note-Book. on my return to Valparaiso, after a months interval, I examined the [changed from 'this'] paper.—The Spots

['where I had placed' marked out] were ['now' added] stained of pale dirty brown (V accompanying Specimen).—The greater number of little spores had been crushed & were not to be distinguished. I ['extracted' marked out and 'removed however' added] some tolerably perfect.—Being placed in water they became more transparent & showed with transmitted as well as reflected ['light' added] a fine Arterial Blood Red Color.—They varied in size ['& the outline is quite *smooth*' marked out] the largest & most perfect being exactly 1/1000 of inch in diameter. The outline is not perfectly regular or smooth [The last sentence added later?]

This description continues on page 320, *verso*:

The red centre is seen to have a thin ['trans' marked out and 'nearly' added] colourless bark: the red matter appears to be a fluid which is not miscible with water. Alcohol or Sulphuric Acid.—It would appear a fluid from being separable into various sized perfect globules.—on applying diluted Sulph. Acid. the outer coat is either destroyed or so very soft that ['the' marked out and 'on' added] the least touch falls. off. is composed [illegible pencilled comment added] of an outer most delicate tunic lined with granular matter.—This bark ['is' ?, marked out and 'was' added] ['often' marked out] torn & ragged in many of those specimens I removed from the Paper: ['The (two illegible words) red body' marked out and 'is perfectly spherical & smooth' added] [illegible phrase marked out] after remaining some minutes in the Acid. is acted [?] in two very different [illegible word]: in one case, suddenly with a start the sphere enlarges to twice or thrice its previous diameter, the color becomes much ['paler' marked out and 'less intense (& this (illegible word) to (illegible word)' added]; the whole appearing as a drop of pale red fluid, not miscible in surrounding medium. There has also further a cloud of equal more [?] minute ['circular' marked out and 'spherical' added] grains.—I believe they are ['granular' marked out and 'spherical' added] for they are but just Visible with my highest power 1/20th ['inch' added] focal dist [?] lens.—In other cases ['the red ball matter contracts' marked out], the red fluid ['being' marked out and 'is owing to its contraction' added] seen to be contained in a, thin ['colourless' added] case—& ['contains' marked out and 'has' added] in ['the' added] middle a darker spot. ['In this state generally [?] strong acid appears to have scarcely any further effect:—' added] It would appear probably that in the first case, that this tunic ['must have' added] suddenly

Continued on page 319, *verso*:

[page] 4)

burst & that the cloud of granules is the dark spot in middle of red fluid.—We have then 1st. colourless outer tunic, with (2d) do [i.e., ditto] granular lining. 3d. tunic of red glouble. 4th. red fluid. 5th certain most minute, scarcely visible granules.—With respect to the Red fluid, ['of course it cannot' marked out] its existance is only known after a short soaking in fluids: how it may exist in the dry ['or fresh' marked out] specimen I do not know.—['It is singular' added] In one case, the outer bark = about 1/6 in [i.e., inch] focal dist., [' = ' to 'dist' circled] contained two distinct red balls.—['The [bracket in original] existance of ('red snow' marked out and 'this Crypto plant substance' added) in Lat: ('country' marked out) ('growing' added and 'the' marked out) at a great elevation in the Perpetual Snow. appears a rather common ('fact' marked out and 'instance' added) of the geographical distribution of plants.' marked out] [bracket in original] I understand the late Navigators have found Red Snow in the Antarctic regions.—The existence of this Cryptogamic plant in Lat [latitude not added] S. growing on the lower patches of Perpetual Snow. is a rather ['cur' marked out and 'interesting' added] fact in the laws of the distribution of Vegetables. Have found on many mountains in Europe and on rocks in Scotland ['Have' to 'Scotland' added much later in pencil]

Notes on page 320A have been inserted later in pencil:

Vol. IV. p. 231 Greville Scottish Cryptogam Flora describes [Greville, 1825–26]—balls, fine garnet colour; exact spherical nearly opake seted [?] on substratum of gelatinous matter; for most nearly equal in size. = Smaller ones greatly surrounded by pellucid limb, gradually becomes less on globules unevan (?) in size.—in full size specimen internal surface appears granulated, from contained granules; granules 6–8 in number globose. capsule left floating after bursting of sphere.—*Protococcus* nivalis Decandolle [presumably DeCandolle & Sprengel, 1821] could not see granules only oily fluid.—

There is no notice taken of being *in* [underlined twice] groups

---

Think presence owing to flowing of melted snow:—Rank at higher level

On page 320, *verso* is added:

Bauer [not traced] states they are 1/100 of a line

Were [?] my Specimen going over with envelope.—

This last note refers to a letter from Darwin to Henslow from Valparaiso, written on 18 April 1835. In it, Darwin wrote (Burkhardt & Smith, 1985*b*: 443):

On some of the large patches of perpetual snow I found the famous Red Snow of the Arctic countries.——I send with this letter my observations & a piece of Paper on which I tried to dry some specimens. If the fact is new, & you think it worth while, either yourself examine them or send them to whoever has described the specimens from the North, & publish a notice in any of the periodicals.——

Nothing was published on these observations until Darwin's *Journal of Researches* appeared. The paper to which the specimens were attached remains with the letter in the archives at Kew.

Conferva clavata var. *darwinii* Hooker fil., *Flora Antarctica, 2*: 493 (1847). 'Hab. Cape Tres Montes, on *Sphacelaria funicularis; C. Darwin, Esq.*' (Cladophoraceae). Illustrated in Hooker's plate CXCII. He states: 'Of this variety we have seen but one specimen and refer it doubtfully to the *C. clavata* of the Cape of Good Hope and New Zealand, to which it is certainly very closely allied.' According to De Toni (1889), the correct name for this taxon is *Chaetomorpha darwinii* (Hooker fil.) Kützing. The specimen should be at the British Museum (Natural History).

Chrysophyta (Bacillariophyceae)

Asteromphyalos darwinii Ehrenberg, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königlich Preussischen Akademie der Wissenschaften zu Berlin,* 9: 200 (1844). I have not seen the original publication, but presumably the name is based on a Darwin collection. Hooker (1847: 513) cited: 'Hab. In a scum floating in the ocean, in Lat. 64° S., Long. 160° W.' Most of Christian Gottfried Ehrenberg's herbarium in Berlin was destroyed during the Second World War, but his diatom types apparently are extant (Stafleu & Cowan, 1976).

On 17 April 1844 (Burkhardt & Smith, 1985*a*), Darwin wrote to J. D. Hooker (copy in the Darwin–Hooker correspondence at Kew, number 18, page 30) that:

> I have waited in vain for Dr. Dieffenbach's [Ernst Dieffenbach (1811–55), German naturalist and geologist] answer to my queries to Ehrenberg [1795–1876, Professor of Natural Sciences at the University of Berlin] for more particulars regarding what he wanted, and therefore I am going at once to send off a cargo of little packets to Berlin. Those which I send are valueless, except to Ehrenberg, and therefore I am going to tell him *not* to return mine, and will you kindly send me a line by return of Post (to Down) [Darwin's letter was sent from London] telling me what I shall say to him about returning your more valuable cargo? Shall I tell him that the sea-weed are undescribed & that you intend describing them, which will show that you do not wish him to describe them, or say nothing?

Ehrenberg described only the diatoms, but Hooker did not describe any macroscopic 'sea-weed', only the *Conferva* discussed above. Apparently Darwin said nothing.

Cocconema lunula Ehrenberg. Reported by Hooker (1847: 511): 'In a white pigment used by the Fuegians, *C. Darwin, Esq.*' According to De Toni (1889), the correct name for this taxon is *Cymbella cistula* var. *maculata* (Kützing) Grunov. Like the species above and below, it was sent to Ehrenberg by Darwin for identification (Ehrenberg, 1845).

Pinnularia borealis Ehrenberg. Reported by Hooker (1847: 511): 'In a pigment used by the Fuegians; *C. Darwin, Esq.*' According to De Toni (1889), the correct name for this species is *Navicula borealis* (Ehrenberg) Kützing.

Darwin described the pigments in which these diatoms were found on pp. 148–149 of the *Zoological Diary*:

1833 Tierra del Fuego

. . . . . .

> ['Fuegian Paints' in margin] The Fuegians paint. their facies. bodies & hair. with white, red & black in various figures & quantities: The red is the oxide of Iron & is prepared by being ['974 (not spirits)' in margin] collected near the streams, dried & burnt. The White. is of a more curious nature. in the ['(a)' in margin] state fit for use it is of very little specific gravity.—it is collected from under water, is made into balls (as J Button [Jemmy Button, a native of Tierra del Fuego] expresses it. 'all the same Ostrichs egg') & burnt: did not effervesce with acids.— & with bit of Cobalt. gave a promenent

[page] 149

1833 Tierra del Fuego

> ['Fuegian *Colors*' in margin] blue.—I suppose therefore it nearly pure alumine.—It occurs in the Slate Mountains. I imagine from the decomposition of the beds of Feldspathic rock.— The black I have not obtained: The black, is I believe only charcoal & oil:—
>
> Note (a) is given on page 148, *verso*:
>
> (a) I found some of the feldspathic greenstones decomposed into a white substance to the depth of 3/10 of inch.—
>
> The diatoms, therefore, could have come from either the red or white pigments.

Phaeophyta

Sphacelaria funicularis Montagne (Sphacelariaceae). Reported by Hooker (1847: 469): 'Hab. Cape Tres Montes, South Chili; *C. Darwin, Esq.*' According to De Toni (1895), the correct name is *Stypocaulon funiculare* (Montagne) Kützing. The collection should be at the British Museum (Natural History).

Macrocystis pyrifera (Linnaeus) C. A. Agardh (Lessoniaceae). Although Darwin apparently did not collect this large, conspicuous brown alga, he noted it in the *Zoological Diary* (p. 242) because of its ecological importance:

1834 April E. Falkland Isd.

. . . . . .

['*Zoology* (marine)' in margin] The Zoology of the sea. is I believe generally the same here as in Tierra del Fuego: Its main striking feature is the immense quantity & number of kinds of organic beings which are intimately connected with the Kelp.—This plant ['I believe' marked out] (The Fucus giganteus of Solander) is *universally* attached on rocks. from those which are awash at low water & those being in [number not filled in] fathoms water: it even *frequently* is attached to round stones lying in mud. From the degree to which these Southern lands are intersected by water, & the depth in which Kelp grows the quantity may well be imagined. but not to a greater degree than it exists.—I can only compare these great forests; to terrestrial ones in the most teeming part of the Tropics; yet if the latter in any country were to be destroyed I do not believe ['(a)' in margin] *nearly* [underlined twice] the same number of animals would perish in them, as would happen in the case of Kelp: All the fishing quadrupeds & birds (& man) hunt the beds attracted by the infinite number of small fish. which live amongst the leaves: (the *kinds* are not so very numerous, my specimens I believe show nearly all.)— . . .

Note (a) is on page 242, *verso*:

'(a) I refer to numbers of individuals as well as kinds'.

This discussion is continued on page 243, following another note:

If this Fucus was to cease living; with it would go ['many of' added] the Seals, the Cormorants & certainly the small fish & then sooner or later the Fuegian Man ['must follow.—' added] the greater number of invertibrates would likewise perish, but how many it is hard to conjecture.

A note on page 243, *verso* also addresses the distribution of *Macrocystis*:

(c) Mr Stokes [i.e., John Lort Stokes (1812–85), Mate and Assistant Surveyor and Darwin's roommate on the *Beagle*] states that the furthest point North he has seen the Kelp on the East coast is about St Elena. in Lat 43°. [Punta Santa Elena, prov. Chubut, Argentina.]—It not uncommonly grows in 10 & 15 Fathom water.— . . .
Near the I of Chiloe [Chile] Lat. 42°, kelp grows with no great vigor—but it is very curious to see that here neither the numerous shells & Clytias [i.e., *Clytia*, Hydrozoa, hydroids] & Isopod [i.e., Isopoda, isopods] & Crust [i.e., Crustacea, crustaceans] are quite absent; some few encrusting Flustra [a genus of Bryozoa, bryozoans], but they are much rarer; & some different compound Ascidiae [Urochordata, tunicates].—

There is more on *Macrocystis* in East Falkland Island on page 243:

. . . this island is much intersected by water (Capt Fitz-Roy [Robert FitzRoy, 1805–65, Captain of the *Beagle*] has compared it to the arms of the Cuttle fish). thus far inland seas are ['nearly' added] motionless, they seem to produce scarcely any organic beings . . .
. . . the water instead of [illegible word: '–-esisting' ?] ['(a)' in margin] the elegant forms of sea-weeds & Corallines; [illegible word marked out] throws up

Continued on page 243, *verso*:

(a) a putrid mass of rubbish.—The powers however of Geology are quickly covering up these unproductive specks on this our globe.—V. 157 & 158 [i.e., see pages 157 and 158 of the *Zoological Diary*] for more particulars

On page 158 Darwin entered under 'General Observations':

1833 Jan & Feb. Tierra del Fuego

. . . . . .

The sea is very favourable to the growth of Hydrophites. [i.e. hydrophytes, plants growing in water] Here grows Fucus giganteus in 25 fathom water:—the little pools, abound with small species, ['(c)' in margin] almost to the exclusion of Corallines.—Corallina was present: & some species of Clytia [Hydrozoa, hydroids] (or allied to it) grew on the F Giganteus.—They were the same species which I found floating in Lat 45°: V P 135.—[see above]

Two notes are given on page 158, *verso*:

(b) It will be curious to ascertain. whether the plants of Tierra del bespeak as high as a Latitude. as many of the above facts point out:—[this is opposite a discussion of insect distributions and before the above (p. 158)]
(c) The immense number of encrusting Corallina form the ['834' in margin] strongest exception to this remark.—I think a comparison of the Corallines of this Country & England (nearly similarly situated) would be interesting as showing a very wide difference in the leading forms.—

Throughout his notes, Darwin was suggesting such comparisons as this.

Rhodophyta
Polysiphonia berkeleyi (Montagne) Harvey (Rhodomelaceae). Reported by Harvey (1847: 47): 'Straits of Magalhaens, *Mr. Darwin.* . . . (*v.s. in Herb. T.C.D. comm. cl. Hooker.*)'. There is a specimen at TCD: 'Heterosiphonia berkleyi Mont. Cape Horn Darwin? Ex Herb. Berkeley.' However, there is some question as to whether it is the specimen cited by Harvey, or indeed if it is a Darwin specimen at all.

Darwin made extensive notes in the *Zoological Diary* on several microscopic marine algae seen on the voyage. These were printed in much abbreviated form in the *Journal of Researches* (Darwin, 1839: 14–20; 1845: 14–18). Only the first instance has pencilled lines drawn through the pages, however, indicating that it has been copied and used elsewhere. In a letter to J. D. Hooker of April 1844, in which he asked for advice regarding the second edition of the *Journal of Researches*, Darwin queried (copy in the Darwin–Hooker correspondence at Kew, number 31, page 61): 'Will you tell me, may I not leave out, without any loss, the little and imperfect account (p. 14–16) in my Journal of the oceanic confervae?' This account is quite similar in both editions.

Page 31 reads:

1832 March Abrolhos Shoals

. . . . . .

['*Oscillaria*' in margin] At noon Lat 17° [changed from 37], 43′ S & Long 37°. 23′ W ['(a)' in margin] my attention was called by Mr. Chaffers [Master of the *Beagle*] observing that the sea was in places discoloured. ['390: 391 not spirits' in margin]—Even from the Poop. the cause was visible. it was owing to the ['(e)' in margin] presence of numberless minute whitish particles, These when examined under a lens. whose focal distance was ['under' marked out] above 1/10 of inch, appeared like bits of ['chopped' added] hay. the ligneous fibres of which projected beyond the end.—

Notes (a) and (e) are on page 30, *verso*:

(a) An appearance similar to this one was seen between Canary & Cape de Verd at about 1/2 a mile distance from the ship.
(a) Nos not spirits. 390 391 [This note also refers to (a) on p. 32]
(e) Mr. Brown [i.e., Robert Brown (1773–1858), Keeper of Botany at the British Museum] seems to have observed these Oscillaria on the South shore of Australia. 'particles 1/20

length. composed of cohering jointed fibres, of unequal length, so that the compound particle appeared as if torn' Flinders Voyage Vol I P 92:—[i.e., Flinders, 1814; botanical comments by Robert Brown]

Page 32 continues:

1832 March Ar[changed from l]bolhos Shoals

['*Oscillaria*' in margin] These particles seen under a higher ['x' in margin] power consisted of about 20 fibrils. adhering side by side & forming ['either' added] a flat or a nearly cylindrical bit of mat.—These ['cylin' marked out] fibrils or stalks were in length from .02 to .03 of inch; in diameter 1/2000: extremities round, *rather* broader, transparent; internally a tube ['(a)' in margin] containing concentric layer of ['a' marked out] greenish brown granules ['Hence appearing jointed: these layers are ('close to' marked out) numerous' added] The external tube was marked by fine circular rings. ['(??)' added in pencil] I once thought that I perceived a motion in these fibrils: from the description in Dic Class. ['(b) & 31' in margin] I suppose it is a oscillaria.—After being kept for an hour in water. most of them fell to the bottom of the Basin. & it appeared to me that in this state all the granules had been expelled: Figures are quite inadequate to give any idea of the numbers of these ['groups' added] of Oscillaria which the sea contained.—A bucket which had been lowered for some water, had its ['interior' added] sides (being left for short time at rest) literally coated with these minute particles.—I should think they extended for some distance; The sea. 3 [changed from 2] hours afterwards contained a few.—

Note (b) is on page 30, *verso*:

(b) Bory St Vincent [i.e., Bory de Saint-Vincent, 1822–31] says that the Oscillaria when jointed very soon loose their power of motion.—Dic Class: [i.e., *Dictionnaire classique d'histoire naturelle*]

Note (a) is on page 31, *verso*:

(a) It required a 1/30" focal lens in order to see the internal tube ['x' in margin] At noon on 31st ['30th' marked out] of March Lat. 19. 52′ S. Long 38. 7′ W. ['No soundings at this spot.—But 6 knots before 36 h.' in margin] the ship passed through a band of these oscillaria a mile in width I reexamined them.—The bundle were often cylindrical. containing from 20 . . . to 60 fibrils. a large ['one' added]. taking the extreme points was in length was .03 & in bredth .009—Fibrils were perfectly straight; varied much in length; were I presume enveloped in a fluid.—as in many of the bundles the fibrils did not touch each other.—Being kept till the following morning the particles became of a much brigher green & ['a' marked out] were partially decomposed: a considerable quantity of brownish flocculent matter lying at the bottom of the cup.—The fresh oscillaria placed in Alcohol. uncoiled. moved [word obscured by tape] & finally burst.—These appearances are called by the Sailors Spawn.—At 4 PM we passed through another ['irregular' added] band. running E & W.—about 10 yards wide & about 2 & 1/2 miles long.—The sea was the colour of thick reddish mud.—I believe each bundle of oscillaria touched another.—I judged of this likewise by the thickness of the covering on some water brought up in a bucket.—(At this rate in this narrow band & at a more [?] moderate computation. in each square inch of surface there must have been 499950 fibrils or separate Oscillaria.—In the whole band: 323 967 600 00 000: or ['323' in margin] millions of millions &c.—?/ Perhaps in square inch about 100000 ['?' to '100000' apparently added later]

On 23 July 1832, Darwin wrote to Henslow (Burkhardt & Smith, 1985*b*: 251):

> Every one has heard of the dislocoured [i.e., discoloured] streaks of water in the Equatorial regions.——One I examined was owing to the presence of such minute Oscillaria that in each square inch of surface there must have been at least one hundred thousand present.—— After this I had better be silent.——for you will think me a Baron Munchausen amongst Naturalists.——

From his description, this is certainly *Oscillatoria erythraea* (Ehrenberg) Kützing (Oscillatoriaceae), a blue-green alga (Cyanophyta).

On 15 August 1844, Darwin wrote to J. D. Hooker regarding this collection (copy in the Darwin-Hooker correspondence at Kew, number 15, page 26):

> In looking over some corals I found the enclosed sea-weed from the Galapagos Island [the 's' presumably left off by the copiest], and I believe from 12 fathoms deep; I thought perhaps you wold like to have it. I also send, either for yourself or Mr. Harvey, specimens of 390 & 391 of the little conferva in bundles described at p. 14 of my Journal [i.e., Darwin, 1839]. I have not, however, looked to see whether they are preserved. [Whether they have survived preservation.] 392 is a minute attached conferva from 17 fathoms off the Abrolhos Island coast of Brazil. Please throw away these specimens if of no use.

The 'sea-weed" is not the coralline of number 3251, cited above, and it remains unidentified. Numbers 390 and 391 are this *Oscillatoria*, while number 392 also is unidentified. I can hardly imagine J. D. Hooker throwing away any of Darwin's specimens, but he may have done so if they had deteriorated while in spirits.

The next *Zoological Diary* entry of this type has been much edited. It begins on page 316:

1835 March 7–9 Chili

> ['*Infusoria*' in margin] The sea some few leagues North of Concepcion was of a muddy color in great bands, certainly more than 1 or 2 miles long.—Again 60 miles South of Valparaiso the same appearance was very extensive; although 40 or 50 miles from the shore I thought it was owing to a current of muddy water brought down from the Maypo [i.e., the Río Maipo, Santiago province] ['B' in margin, added in pencil] Mr. Sulivan [i.e., Bartholomew James Sulivan (1810–90), Second Lieutenant on the *Beagle*] ['however' added] having drawn some up in a glass. thought he saw by the aid of a lens moving points.—I examined the water;—it was slightly stained ['as if by' added] red ['dust' added].—& after leaving it for some time quiet. ['r' marked out] a cloud collected at the bottom, with ['a lens of one fourth of an inch' added in pencil] ['1/4' marked out] focal distance small hyaline spots might be seen darting about with great rapidity & frequently exploding. Examined with a ['much' added in pencil] high['er' added in pencil] ['1/10 & 1/20' marked out in pencil] power. their shape is oval. & contracted by a ring ['around' added] ['on' marked out] the centre from which ['line' added] on all sides ['proceed' marked out] curved little ['bristles' marked out and 'seta' added] [drawing in margin] ['proceed' added in pencil] & these are the organs of motion. ['one end of the body is narrower & more pointed than the other' added in pencil] It is very difficult to examine these [changed from 'this'] animal ['cula' added] for almost the instant motion ceases their bodies burst. Sometimes both end ['exp marked out] burst at once. sometime only one, & [added in pencil] a quantity of coarse brownish granular matter is ejected which adheres [?] very slightly. ['(a)' marked out in margin]—the ring with the seta ['sometimes retains' added in pencil in margin] ['its irritability' added and 'life sometimes' and an illegible word marked out] ['for a little while' added] after the ends have ejected ['their' added] contents, ['&' added in pencil over 'it'] continues a riggling uneven motion. The animal, an instant before bursting expands to half again its natural size; about ['fifteen' added in pencil and 15' marked out in pencil] seconds after the rapid progressive motion ['has' added in

pencil in margin] ceased., the explosions take place.—In a few cases it was preceeded for a [added in pencil over 'an'] ['short' added] interval by a rotating motion on the larger axis. ['Directly' marked out] ['perhaps 2 minutes' added and marked out] about two minutes after any number were isolated in ['Very soon, perhaps' written over another phrase in pencil, then marked out]

Page 317 continues:

1835 March. Chili

['Infusoria' in margin, marked out in pencil] a drop of water. they thus perished.—The animal moves ['by the aid of the vibratory cilia' added in pencil] with ['the narrow' added in pencil] apex forwards, & generally ['with' marked out and 'by' added] rapid starts; ['The setae ('were' marked out) are rapidly vibrating around the Body.—' marked out in pencil] The immediate bursting of the body prevented any close examination; they would sometimes explode ['even' added] whilst crossing the field of vision.—They are exceedingly minute ['and quite' added in pencil in margin] invisible to the naked eye ['only' added and 'being' marked out] covering ['rather more' added in pencil and marked out] ['a trifle larger (before explosion)' marked out in pencil] ['a space' added in pencil in margin] ['than' marked out in pencil and 'equal to' added in pencil] the square of ['1/1000' marked out in pencil] .001 of ['an' added] inch. Their numbers ['are' added] infinite the smallest drop of water, which I could remove, containing very many.—We passed through ['in one day' added in pencil] two masses of water thus stained, ['to day' marked out in pencil and 'of which' added in pencil] the latter ['of the two' marked out] must have been ['B' added in pencil in margin] ['of' marked out in pencil] *several* miles ['in' added] extent B.] [Bracket in original. From here downward, the page is marked out by vertical pencil lines] the edge of the blue ['water' marked out in pencil] & red ['water' added in pencil] was ['quite' marked out in pencil] and 'perfectly' added in pencil] defined.—What infinite numbers of these [changed in pencil from 'this] ['microscopical' added in pencil] animal['s' added in pencil]!—The weather had been for some days calm & cloudy.—The color of the water as seen at some distance, was that of a river which has flowed through a red-Clay district: Looking vertically downwards on the sea. in the shade, the tint was quite as deep as Chocolate.—It belongs to the family of Trichodes [i.e., *Trichodesmium*, Oscillatoriaceae] of Bory St Vincent [i.e., Bory de Saint-Vincent, 1822–31] but does not agree with any of his species: The sea at this time, I fancy owing to the Calms abounds to a wonderful degree with various animals.—This fact of sea so very extensively colored by Infusoria. appears very curious.

A note on page 316, *verso* has been added later:

(a) The granular matter is contained in a thin capsular membrane, to this membrane on the ring the transparent. tapering fillets or bristles are fixed.—The motion of these seta. is that of collapsing on the obtuse end.—the Water only appeared as it it to [i.e., if it too] contained a little of the finest red dust.—

A further addition has been made on page 317, *verso*:

theme: The patches of red sea. in the Southern Latitudes owing to the Whale food or rather large red. Crust. Mac: [i.e., Crustacea Malacostraca, krill] in great shoals.—

From the description and Darwin's drawing on the margin of page 316, this is a dinoflagellate (Pyrrophyta), probably a species of *Gymnodinium* (Gymnodiniaceae) or *Gonyaulax* (Gonyaulacaceae).
A third description starts on page 349:

1835 349 Coast of Australia 349

['*Conferva*' in margin] March 18th. The ship being about 50 miles West ['(B)' written over 'a' in margin] from Cape Leeuwin [Western Australia], observed the sea, covered with particles. as if thinly scattered over with fine dust.—Some water being placed in a glass; with an ordinary lens, the particles appeared like equal sized bits of the fibres of any white wood.—on examination under higher powers. Each particle is seen to consist of from 10–15 ['of' marked out] cylindrical fibres. These are loosely attached side by side all together; their extremities are seldom quite equal, a few projecting at each end.—The bundle. was about 1/50th of inch in length, but ['each' marked out and 'any separate' added] fibre. rather less. perhaps 1/60th.—The color. a very pale. brownish green.—Each separate ['2/3000' in margin] fibre is perfectly cylindrical & rounded off at both extremities; ['its diameter is as nearly as possible 2/3000 of inch' added] the whole is divided by transverse partitions which occur at regular intervals being about half the diameter of the fibre. [Drawing in margin.] ['Between' marked out and 'Within' added] the cells granular matter is contained: but my microscope scarcely sufficed for this.—Extremities colourless. with little or no granular matter.—The bundles. must. I think, be enveloped in some adhesive matter. because in a glass. on touching the sides they almost always adhere.—The ['number' marked out and 'extent' added] ['quantity' marked out] of sea covered by this Coferva was not very ['extensive' marked out and 'great' added].—The morning was. calm. ['a' in margin]—Vide similar account near Abrolhos.—[see above]

Notes (a) and (B) are given on page 349, *verso*:

(a). Humboldt (Pers Narr: Vol VI. P 804.) [Humboldt, 1814–29] mentions in the W. Indian sea, that the water was covered with a thin skin. composed of fibrous particles; states is found in the Gulf Stream; channel of Bahama, & B Ayres.—Are these fibrous particles. the kind of Conferva here described? Did I not on coast of Brazil, however, myself see some real fibro-gelatinous particles?—a similar appearance is noticed by Capt King [i.e., Philip Parker King (1793–1856); Darwin visited him in Australia in late January 1836] on NW extremity of N. Holland [i.e., Australia]. called by Capt Cooks [i.e., James Cook (1728–79)] sailor, + + + 'sea saw dust' a very good name.—Hawkesworth. Vol III. P 248. [Hawkesworth, 1773]—& Mr. Peron. (who will describe it) Voy.. Vol II Chapt: 31. [Péron, 1816] [Humboldt's, Cook's, and Hawkesworth's books were on the *Beagle* (Burkhardt & Smith, 1985*b*), but Péron's was not. This note, then, was added following the return of the *Beagle* to England while Darwin was preparing his *Journal of Researches*!]
+ + +
Cooks of [?] Voy. II Vol. Chart VII. [Cook, 1777; or Cook, 1784] is described as a Conferva.—
(B) On passage from Mauritius to C. of Good Hope Lat 37°. 30′ sea with the green flocculent tufts & sawdust. during two calm day in very great quantities Must be a most abundant marine production

This again is probably *Oscillatoria erythraea*.
The last entry, on pages 350 and 350, *verso* of the *Zoological Diary*, also has been heavily edited:

1835 April 1st Keeling Isds. 350

['*Conferva* (A)' in margin] During two days before arriving at the Keeling Isds in the. Indian ocean, in many parts I saw masses of flocculent matter ['of' added and 'extremely pale' marked out] ['a brownish green colour' added in pencil] floating in the sea. They varyed in size from half to three or [changed from 'a' in pencil] four inches ['square' added in pencil] ['in size' marked out] ['and' added in pencil in margin] ['are' marked out in pencil and 'were' added in pencil] quite irregular in figure ['& are colored an' marked out in pencil] ['extremely

pale brownish green.' marked out in pencil] In an opake vessel these masses ['cannot' marked out, 'can' in pencil, 'not' in ink] ['could' added in pencil] ['only with difficulty' added] be distinguished; but in a glass ['they' added in pencil] were ['very distinctly' marked out in pencil and 'clearly' added in pencil] visible. Under the microscope the [changed in pencil from 'these'] flocculent ['masses' marked out] ['matter' added in pencil and 'are' marked out in pencil] seen to consist of two kinds of Conferva, between which I am quite ignorant whether there ['be' marked out] ['is' added in pencil] any connection. Minute cylindrical bodies. conical at each extremity. are involved, in vast numbers, in a mass of fine threads. These threads have a diameter of about 2/3000th of an inch; they possess an internal lining; they are divided at irregular & *very wide* intervals, by transverse septa; Their length is extreme, so that I could never certainly ascertain the form of the extremity; They are all curvilinear & resemble in position a handful of hair, coiled & squeezed together. In the midst of these threads & probably connected by ['some' added] viscid [changed in pencil from 'viscous'] fluid. ['there' added in pencil] are innumberable. cylindrical hollow ['transparent' added] bodies: each extremity of which is terminated by a cone [drawing in margin] produced into the ['(a)' in margin] finest point.—Their diameter is tolerably

Continued on page 350, *verso*:

(a) constant between ['6 and 8/1000th' marked out in pencil and '·006 and ·008' added in pencil] of an inch. Their length varies considerably from ·04 to ·06 & even sometime to ·08.—Near to ['the' marked out and 'one' added] extremity of the cylindrical part. a green septum. ['or mass a' marked out, 'granular matter' marked out in pencil] formed of ['a' marked out] ['granular matter and' added in pencil] thickest in the middle ['as' marked out in pencil and 'may' added in pencil] generally ['to' marked out in pencil] be seen.—This I believe ['to be' marked out in pencil and 'is' added in pencil] the bottom of a ['sac' marked out] most delicate. colourless sack, composed of a ['granular or'' marked out in pencil] pulpy ['matter' marked out in pencil and 'substance' added in pencil]. which lines the exterior case [changed in pencil from 'casing'], but does not extend to [illegible word marked out] ['within' added in pencil] the ['depth' (?) marked out and 'extreme conical' added in pencil] points [corrected in pencil]. ['of the opposite cone.—In place of the green septum ('like' added) formed body in some I observed a small but perfect sphere of brownish granular matter;' marked out in pencil] & I ['saw' marked out in pencil] ['observed' added] ['on' marked out in pencil and 'the' added in pencil] [The following is inserted in pencil between the previous marked out lines 'In some, a small but perfect sphere of brownish granular matter supplied the place of the septum.'] curious process by which these [changed from 'this'] little balls ['is' marked out and 'are' added] produced. A] [bracket in original] The pulpy matter of the internal coating suddenly grouped itself into lines, [illegible word, 'some of' ?] which assumed an obscure radiated position. then with irregular & rapid movement the lining contracted & united itself, & in a second the whole matter was collected into the most perfect little sphere, which motionless occupied the position of the septum at one end of the transparent hollow case. I can describe these motions by a simile: a bag of unequal thickness & composed of some highly elastic matter. being distened by a fluid: & then such fluid being allowed to escape. with some rapidity, the coats of the bag would contract & unite with similar movements.—This rapid prosess perhaps is a morbid one, owing to injury: certainly [illegible word marked out] in many cases ['with added] such injury the process commenced.—I saw several ['pair' added] of these bodies. attached to each other, cone along side cone, at that end where the Septem occurs. I do not know whether they ['constantly' added] adhere in this manner when floating in the ocean.—

A drawing showing this method of attachment ends the description. It is reproduced in the *Journal of Researches* (Darwin, 1839, 1845). This is probably another blue-green alga (Cyanophyta), but I am unable to identify the genus.

Plants in Spirits of Wine

No list of plants in spirits analogous to the *Plant Notes* has yet been found. However, it will be seen below that there is excellent evidence that such a list was prepared. Pencilled notations by Darwin in the *Specimens in Spirits of Wine Notebooks* and by Covington in the *Zoological Diary* are identical to those in the *Specimen Notebooks* and *Zoological Diary* used in compiling the *Plant Notes*. The list in this section was formed in 1976 when I went through the *Specimens in Spirits of Wine Notebooks* at Down House and copied out all the entries that were marked by Darwin with a pencilled 'P'. This was fortuitous, as the notebooks on dried and preserved biological specimens have since been misplaced. [Note added in proof: They are now once again at Down House.]

The *Specimens in Spirits of Wine Notebooks* were unpaged, so the date and locality that Darwin characteristically placed at the top of the page precedes the collection(s), listed from that page. However, if a date and locality are given further down on the page and precede the collection(s), then these are given instead. Darwin also characteristically gave the collections in order on the right-hand page, leaving the facing (left-hand) page blank for more extended or later comments. These are added as appropriate, as are relevant passages from the *Zoological Diary*, *Diary*, or correspondence. The majority of the preserved specimens are fungi. Unlike the other cryptogams, which were sent to the British Museum (Natural History) (BM) on permanent loan from the Royal Botanic Gardens, Kew (K) in 1969, Darwin's fungi remain at Kew. Most of the fungal collections were sent by Henslow to the Revd M. J. Berkeley. Berkeley's herbarium is now at Kew.

In a letter written in May 1846, Darwin reported to J. D. Hooker (copy in the Darwin-Hooker correspondence at Kew, number 62, pp. 112–113):

> It has just flashed across me suddenly that I brought home a very few plants in spirits of wine (with the colours noted), namely some sea-weeds and two orchideous plants from shady parts of forests of T. del Fuego [the latter numbers 823 and 825 below]——a Calceolaria from Elizabeth Island, St. of Magellan (which at the time I thought a wonderful production of nature!) [number 811] and a salt plant from near a Salina at Port St. Julians in same jar with Opuntia Darwinii from do. [i.e., ditto; both the latter number 794] Has Henslow ever given you these? He is now in Cambridge and could probably find them (if you have not seen them and would like), and this is the reason I write today, though not well.

Hooker apparently inquired of Henslow about these specimens, as the latter wrote on 6 November 1846 to his father Sir William Hooker (1785–1865, Director of the Royal Botanic Gardens, Kew): 'Tell Dr. Jos. I will bring with me on the 19th (as far as London) the 2 bottles he alluded to—but one of them contains a Calceolaria which I suppose Darwin fancied was an orchid.' (Porter, 1980*a*: 520). Like a number of the preserved plant specimens, these have disappeared.

This list starts with the first page of the first *Specimens in Spirits of Wine Notebook*, which is unpaged. The first notebook is titled '*From Jan. 1832. to June 1833* Catalogue for Animals *in Spirits of Wine* Nos: 1 to 660.' on the cover in ink in Darwin's hand.

1832

Jan Specimens preserved in spirits & with tin labels ['A' in margin; the jars in which the preserved specimens were placed were labelled for each locality, beginning with A.]

1832 Feb.–March Bahia [Brazil]

136 Fungus

I found no specimen with this number.
Darwin was in and around Bahia from 28 February to 18 March 1832.

1832 April Rio de Janeiro [Brazil]

194 Fungus

No specimen was found.
This entry is marked with an 'x', indicating that Darwin wished to know its name in order to include it in his *Journal of Researches* (Darwin, 1839). His fungi were identified by the Revd Miles Joseph Berkeley (1803–89), and presumably this is a notation by Darwin for him. There is a note on the facing page: '194 Growing on wet plank in a darkish outhouse uniform colour. Within light 'reddish-brown.'—' Darwin was in Rio de Janeiro and its vicinity from 5 April through 5 July 1832.

1832 May. Rio de Janeiro

216 Fungus. colour pale. deep [?] yellow

Agaricus salebrosus Berkeley, 1842, *Ann. Mag. Nat. Hist. 9:* 444. (Agaricaceae): type specimen at K ('Ag salebrosus Berk. Rio Janeiro. May 1832'). Filed under '*Pleurotus salebrosus* Berk.' Illustrated by Berkeley (1842), who (p. 444) stated that it was 'on sticks, covered with bark.'

232 Lycopodium on turf. colour white

Rather than *Lycopodium* (a clubmoss), Darwin undoubtedly meant *Lycoperdon* (a puffball). As may be seen below, he consistently made this error. In the *Plant Notes*, Covington copied Darwin's errors in the generic names, and Darwin then corrected Covington's 'errors'!
No specimen with this number was found.

1832 June. Rio de Janeiro

245 Hymenophallus the specimen is [unknown word] in fragments from having no method of carrying V 43 [i.e., see page 43 of the *Zoological Diary*]

'Copy' added by Darwin in pencil, a note to Covington for the latter to add that information from page 43 of the *Zoological Diary* to the list of plants in spirits of wine. The specimen has not been found. Page 43 of the *Zoological Diary* includes the following:

1832 June Rio de Janeiro

['Hymen = -phallus' is written in the margin.] Growing in a very thick damp forest (June 4th) did not smell stronger than the Caninus [i.e., the dog stinkhorn, *Mutinus caninus* (Pers.) Fr.]: yet sufficient ['(b)' in margin] to be remarked by the inhabitants: the veil was inserted about 1/2 an inch beneath the cone at top.—top perforated: liquid on it yellowish brown: bag of jelly resembling impudicus [i.e., *Phallus impudicus* L., stinkhorn].—the specimen is only in fragments [In the margin is written 'Copied' in pencil by Covington, indicating that it had been added to another list.]

A note on page 42, *verso* reads:

(b) No. 245.—A Leiodes [i.e., *Leiodes*, Coleoptera, a round fungus beetle] (550 not spirits) flew on it as I was carrying it.—[A line has been drawn across the page from '(b)' to the '(b)' on page 43.]

On 16 June, Darwin wrote to Henslow regarding this collection: 'I found the other day a beautiful Hymenophallus, (but broke it to pieces in bringing home) & with it an accompanying Leiodes.——a most perfect copy of the Barmouth specimen.——' (Burkhardt & Smith, 1985*b*: 239). This latter refers to a collection from Barmouth, North Wales, a seaside resort town where the Darwin family often spent their holidays when Charles was a young man.
In a letter to his Cambridge classmate Charles Whitley (1808–95), Darwin wrote on 9 September 1831 that, 'There will be a paper published about the Fungus, all my conjectures were right.——If any more can be got, & put into gin, & sent to Shrewsbury: [Darwin's home] it will be capital' (Burkhardt & Smith, 1985*b*: 151). Unfortunately, there is no earlier correspondance between the two to shed more light on 'the Fungus'. However, Burkhardt and Smith (1985*b*: 151) provide the following footnote:

> CD apparently sent the fungi to Henslow (see letter to J. S. Henslow, 28 [September 1831]). [brackets in original] A printed announcement of gifts received by the Botanical Museum and Library at Cambridge, dated 25 March 1832, lists 'Phallus impudicus, var? . . . C. Darwin Esq.' No paper by Henslow has, however, been located.

In a later letter to Whitley (23 September 1831), Darwin wrote, 'Some Fungi have arrived much obliged for them.——' (Burkhardt & Smith, 1985*b*: 168). On the 28th, Darwin wrote to Henslow (Burkhardt & Smith, 1985*b*: 170–171):

> I have received another parcel of the Phalli from *Barmouth*.——& another jar of them, which I gathered the day before yesterday in a very damp shady wood: I am more than ever convinced that they are different species.——The Shropshire ones are, whiter more conical & stiffer, than the Barmouth one: the ball more dark coloured & the cap has less jelly, & that not so dark coloured: They are all preserved in gin & *brine* owing to the want of more spirit.——

In spite of Darwin's conviction, both his collection from Shropshire and Whitley's from Barmouth undoubtedly are *Phallus impudicus*. The *P. impudicus* listed on the 'printed announcement of gifts' cited above probably are these, rather than that mentioned by Darwin in his letter of 9 September to Whitley.

246 Fungus [Marked with an 'x'. I did not find this collection.]

There is a note on the facing page: '246 Growing on rotten trees in the forest.——Colour 'Amber & Chestnut brown' cup orbicular. regular & most elegant, Margin folded down'

247 Fungi on rotten wood, in forest

Laschia infundibuliformis Berkeley, 1842 *Ann. Mag. Nat. Hist. 9*:445. (Auriculariaceae); type specimen at K: 'Laschia infundibuliformis, Berk Rio Janeiro. June. 1832.'
Berkeley must have had Darwin's *Specimen Notebook* or a list of plants in spirits of wine in hand, as he cited the specimen as occurring 'On rotten wood in forest.' This phrase is found only in the notebook, not on the specimen's label. Berkeley also illustrated this collection.

267 268. Cryptogam plants in the forest on bits of stick

Berkeley (1842) cited the first as '*Lentinus villosus*, Fr. (non Klz. in 'Linn.') Darw. No. 267. On sticks. Rio Janeiro. May [This should be June.] 1832.' (Tricholomataceae), and the second as '*Nidularia plicata*, Fr., Darw. No. 268. On sticks in forest. Rio Janeiro. June 1832.' (Nidulariaceae). I did not find either collection.

286 Fucus. Botofogo

I did not find this brown alga, collected in the Enseada de Botafogo, prov. Guanabara, Brazil. As his *Diary* entry for 27 June, Darwin wrote:

This is my last day on shore; so I was determined it should not be an idle one. In the bay I found some fine Corallines; the examination of which occupied me during the whole day. Upon the whole I am tolerably contented with what I have done at Rio in Natural History; several important branches have been cut off: Geology is uninteresting, Botany & Ornithology too well known: & the sea totally unproductive excepting in one place in Botofogo Bay;——so that I have been reduced to the lower classes, which inhibit the dry land or fresh water. The number of species of Spiders which I have taken is something enormous. The time during these eleven weeks has passed so delightfully, that my feelings on leaving Botofogo are full of regret & gratitude.

The 'one place in Botofogo Bay' yielded a wealth of algae (see previous section of this paper) and invertebrates.

1832 November & Dec: Monte Video [Uruguay]

476 Chara V 119. ['Copy' added in pencil]

No specimen of this green freshwater alga (Chlorophyta, Characeae) was found, but Darwin noted the following in his *Zoological Diary* (p. 119):

['*Chara*' in margin] Common in running water: In the microscope could clearly perceive a slow circulation of round ['476' in margin] particles.—Branches finely straited. with distant spines. parallel to these the globules moved: In same manner as the Striae. a colourless line encircled s-irally the stem; but ['on' added] one side of this the current ascended & on the other descended, So that in the equal spaces marked by the spine on the stem; the current alternately. was

This continues on page 120:

['*Chara*' in margin] seen flowing upwards & downwards.—The axillae of the branches . are verticillate with pointed cylinders, in these the circulation was evident, but very obscure: Novemb: 20th M: Video

Opposite these notes on both pages, Covington has written 'Copied' in the margin in pencil. This is further evidence that a list of plants in spirits of wine, analogous to the *Plant Notes* was prepared. In his *Diary* entry for 20 November 1832, Darwin wrote (Barlow, 1933: 113): 'Went out collecting on the Mount.' Presumably this *Chara* was collected there.

1833 Tierra del Fuego

528.——Yellow excrescences of the Fagus antarcticus. esculent: V 147 [i.e., see page 147 in the *Zoological Diary*.]

The Antarctic beech, *Nothofagus antarctica* (Forst. f.) Oersted (Fagaceae). However, given Berkeley's notation (see below), the host of this parasitic fungus may have been *N. betuloides* (Mirbel) Oersted.

This is the type of collection of *Cyttaria darwinii* Berkeley, 1845. *Trans. Linn. Soc.* 19:40. (Cyttariaceae): '*Hab.* in *Fagum betuloidem* in Tierra del Fuego. Dec.–Jun.' It is illustrated in his plate IV.

A catalogue of specimens housed in the old Botany School Museum at Cambridge University lists the following: '3766 Jan '14 [i.e., 1914, presumably the date when entered into the catalogue] XVII [i.e., the number of the case in which the collection was placed] Basid. Pezizaceae Cyttaria darwinii (Berk.) ['50' was added later in red pen; presumably, this indicated another case number] From Terra del fuego. brought back by C. Darwin originally dried spirit'. So Darwin's fungus, originally preserved by him in spirits, apparently was removed and dried later, probably by Berkeley, then placed in spirits again. All other of Darwin's fungal collections that I found were dried, although most were originally fixed in spirits.

The above-mentioned collection is in a jar on display at the Botany School, University of Cambridge. The label reads:

Ascomycetes Pezizinae Cyttaria darwinii, (*Berk.*) Some of the original specimens collected by Darwin in Terra-del-Fuego and described by him as forming one of the staple articles of food of the natives. The fungus is parasitic on the Beech (Nothofagus) and has a smooth surface when young, later becoming honeycombed by the formation of the numerous apothecia lined with asci. specimens with membrane still covering apotheica. Young stromata.

There is also a specimen at K in the spirit collection, plus four dried collections: 'Cyttaria darwinii *Berkley* (in L. T. xix. 37) from Tierra del Fuego C. *Darwin*' (the sheet also bears a printed label: '*Cyttaria darwinii* Berk. Tierra del Fuego. *C. Darwin, Esq.*'); 'Cyttaria darwinii, Berk. Tierra del Fuego' (two sheets); and 'Cyttaria darwinii fr. Revd. M. J. Berkeley' (the sheet bears a printed label: 'Herb. C. E. Broome.——Bequeathed 1886.' Christopher Edmund Broome (1812–86) was a British mycologist.). These specimens, and those at Cambridge, are types, from which a lectotype should be chosen.

Darwin made detailed notes on this species in the *Zoological Diary*, which were used by Berkeley (1845) in his paper describing the genus *Cyttaria*. Berkeley (1845: 37) introduced his paper thus:

A very interesting account is given in 'Darwin's Researches,' [i.e., Darwin, 1839] p. 298, of a production which occurs very commonly in Tierra del Fuego, on *Fagus betuloides*, and forms a very important article of food to the natives. From his description, it is clear that it is referable to the order *Fungi*, though its immediate affinities are very obscure. I was, therefore, highly gratified at having the specimens preserved by Mr. Darwin submitted to me for inspection by the kindness of Professor Henslow; and Mr. Darwin has himself been so good as to send me his original notes. . . . Previous to detailing the characters of the genus and species, I shall beg leave to give copious extracts from Mr. Darwin's notes, which, it is to be observed, are to be regarded as loose memoranda, affording merely materials for publication, but of which the value would be much impaired by a bare analysis. . . .

Darwin's notes begin on page 147 of the *Zoological Diary*. They follow, along with indications as to how Berkeley's version differs from the original:

1833 Tierra del Fuego. Edible Fungi

['Excrescences *esculent*:' in margin and marked out in pencil] In the Beech forests. ['says Mr. Darwin, speaking of Tierra del Fuego' added by Berkeley] the trees are much diseased: on the rough excrescences ['grow' placed here by Berkeley] vast numbers ['a' in margin, marked out in pencil] of yellow balls grow.—These are of the ['(528)' in margin] colour of yolk of an egg.—& ['and' in Berkeley] vary in size from ['that of' added by Berkeley] a bullet to ['that of' added by Berkeley] a small apple.—in shape ['they are' added by Berkeley] globular, but a little produced towards the footstalk or ['the footstalk or' deleted by Berkeley] point of attachment. They grow both on the branches & ['and' in Berkeley] stems in groups.—When young.—they contain much fluid & ['and' in Berkeley] are tasteless; but in their older & ['and' in Berkeley] altered state they form a very essential article of food for the Fuegians ['Fuegian' in Berkeley].—The boys collect them & ['and' in Berkeley] they are eaten ['raw' marked out] uncooked with the fish.—When we were in Good Success Bay [Bahía Buen Suceso, prov. Tierra del Fuego, Argentina] in December. [1832] they were then young.—in this state. externally they are ['externally' placed here by Berkeley] quite smooth. turgid & ['and' in Berkeley] of a bright color & [deleted by Berkeley] ['with' added] no internal cavity.—['Upon keeping one in' marked out] The external surface was marked with white spaces. as if ['of' in Berkeley] a membrane covering a cell. (in this state, but rather more advanced, the specimens 528 are). [this phrase deleted by Berkeley]–Upon keeping one in a drawer. my attention was called after some interval by finding it become nearly dry.—the

whole surface honeycombed by regular cells & possessed of ['& possessed of' changed to 'with' by Berkeley] the decided smell of a Fungus.—& ['and' in Berkeley] with a slightly sweet mucous taste:—In this state I have found them: during Jan: & Feb ['January and February (1833)' in Berkeley] over the whole country (with the exception of specimens 528. which were found in Feb. high amongst the mountains). [this phrase deleted by Berkeley]—Upon cutting one into two

Continued on page 148:

1833 Tierra del Fuego

['Esculent *excrescences*' in margin and marked out in pencil] halves. [this changed to 'Upon dividing one' by Berkeley]—the centre part [deleted by Berkeley] is found partly hollow. & ['and' in Berkeley] filled with brown cellular [deleted by Berkeley] ['fibrous' added] matter.—this evidently merely acts as a support. for ['to' in Berkeley] the elastic. semitransparent. ligamentous. substance. which forms the base & ['and' in Berkeley] sides of the external cells. [from here to 'Some of These balls' below deleted by Berkeley]—The [changed from 'Their'] development of these cells would appear to be main end. to which the growth tends: It is however especially to be noted I cut open great numbers & scarcely ever found the central ['cellular part' added] without one or more larva of the same sort.—In the young state I unfortunately neglected to examine them.—Now I am in doubt. whether it is an excrescence. formed for the nourishment of some insect or a true cryptogamic plant.—The very general occurrence ['of the Larva' added] may be explained. by observing how universally Larva occur in the Bolete in England; ['Some of' added in margin] These balls remain on the trees nearly the whole year. Capt. FitzRoy ['Captain Fitzroy' in Berkeley] has seen them in June.—but great numbers fall on the ground:—[the last phrase deleted by Berkeley]

Note (a) is given on page 147, *verso*:

1834

(a) Feb. Port Famine. ['When young' placed here by Berkeley] Color. 'ochre yellow, & ['and' in Berkeley] dutch orange of the Wernerian Nomenclature'. .—when young. or central part soft & dark [?] ['or' to 'dark' deleted by Berkeley]; strong fungus smell. & sweet taste. [changed to 'smell strong; taste sweet' by Berkeley]—*No larvae*. [underlined twice; deleted by Berkeley]—From the root a hollow vessel passes to the centre. from which white ligamentous rays pass ['extend' in Berkeley] through the ['semi-' added in margin] gelatinous mass to the bottoms ['bottom' in Berkeley] of the cells.—I can have no doubt it is a Crypt: plant.—[this sentence deleted by Berkeley] ['1834 June' in margin] Found some more [deleted by Berkeley] very turgid ones [deleted by Berkeley; 'ones' added], highly elastic. a section of the central parts white [not underlined in Berkeley]; ['and' added by Berkeley] the whole under a high power looks ['looking' in Berkeley] like a Vermicelli ['984' in margin, see below] pudding from the number of small thread like cylinders.—at about 1 1/20^{c} ['one-twentieth' in Berkeley] of ['an' added by Berkeley] inch from exterior ['the external' in Berkeley] surface. there were placed at regular intervals small cup shaped balls 1/12th ['bodies one-twelfth of an inch' in Berkeley] in diameter; of a bright 'dutch orange.'—the cup was filled with adhesive, elastic, colourless. quite transparent [not underlined in Berkeley] matter (['and' added by Berkeley, parentheses deleted] hence it first appeared hollow.)—the upper edge of ['the' added by Berkeley] cup was divided into conical points, about 10 or 12 ['ten or twelve' in Berkeley] in number, [There is a drawing of this in the margin.] & ['and' in Berkeley] these terminated in an irregular bunch of the above ['above mentioned' in Berkeley] threads; the cup was easily detached from ['the' added by Berkeley] surrounding white substance excepting at ['its' added in margin and 'the' marked out] [changed to 'the' by Berkeley] fringed superior edge. [deleted word] Right [deleted by Berkeley] over the cup there

[deleted by Berkeley] was a slight pit in the exterior surface: ['This' added in margin and 'which' marked out] afterward ['afterwards' in Berkeley] becomes an external orifice to the cup. (where ['when' in Berkeley; parentheses and question mark deleted] the gelatinous matter perhaps has formed seeds(?)—)—*Some* of the balls were attacked by Larva. but their entirely irregular course showed they had no connection with the structure.—[this last sentence deleted by Berkeley]

In the margin of page 147 'Copied' is written in pencil and then marked out in pencil.
This interesting edible fungus was discussed and illustrated by Darwin in the *Journal of Researches* (Darwin, 1839, 1845). Robert Brown also found it interesting, and Darwin in 1837 wrote to Henslow of this interest and of his concern lest Brown wanted to borrow the specimens. Darwin's concern is understandable, as Brown had been given the plant collections from the first *Beagle* voyage (1826–30) and showed no sign of identifying them; he never did. He also misplaced Darwin's specimens of *Cyttaria* after they were lent to him (Porter, 1985). No Darwin fungi were found from the British Museum (Natural History) collections now at Kew.

529 Lycopodium (?) [i.e., *Lycoperdon*] on do:——

i.e., 'ditto' also collected on 'the Fagus antarcticus.' This collection was not found.

532: 533: 534. The junction of the parasitical plant (977) with the Fagus

Dried collection number 977 is a specimen of *Myzodendron brachystachyum* DC. (Myzodendraceae), a flowering plant that is parasitic on *Nothofagus*. Number 977 was collected on *N. betuloides*. I did not find any of the specimens fixed in spirits.
These probably were given to Robert Brown, like the *Cyttaria* discussed above, and disappeared. Darwin wrote to Henslow on 28 May 1837 (Barlow, 1967: 131): 'If you should ever have an opportunity, will you send one of those junctions of the Parasitical bush & Beech, which I brought home for Mr. Brown.——I have always forgotten it.——'

1833 March. Falkland Island

557 Hepatica (Marchantia?) damp shaded rocks: Falkland

I did not find any Darwin bryophyte collections from the Falkland Islands.
In 1833 he was there from 1 March through 6 April. On 9 March he entered into his *Diary* that, 'During three days I have been wandering about the country, breaking rocks, shooting snipes, & picking up the few living productions which this island has to boast of.'

1833 May Maldonado [Uruguay]

628 Lycopodium [i.e., *Lycoperdon*] growing on sand dunes

This number is marked with an 'x'. I did not find this collection.
On the opposite page of the *Specimen Notebook*, Darwin noted: 'Are not uncommon on bare sand from the size of pea to that of specimen: surface rough with [unknown word] pyramids: colour nearly pure white, internal mass of larger specimen becoming soft & brown'. He was in and around Maldonado 28 April to 8 July. The *Diary* entry for 30–31 May is, 'Usual quiet occupations; one day's collecting & the next arranging.'

647 Lycopodium [i.e., *Lycoperdon*] or rather phallus V 189.——Copy

Clathrus crispus var. *obovatus* Berkeley, 1842 *Ann. Mag. Nat. Hist.* 9:446. (Clathraceae); type specimen at K ('Clathrus crispus, Turpin. var. Maldonado. May. June. 1842' [*sic*!]
Illustrated by Berkeley in plate XI, who cited: 'On sand-dunes. Maldonado. Not. common. May and June 1832. [1833] "Salmon-coloured; brownish-green internally." ' These notes on colour could only have come from Darwin's notes, presumably copied from the *Zoological Diary* by Covington and incorporated into notes on plants in spirits of wine. Page 189 of the *Zoological Diary* has the following notes, which have 'Copied' in pencil in Covington's handwriting opposite them in the

margin, just as is true for the notes incorporated into the *Plant Notes* discussed in the first part of the present paper:

1833 May June Maldonado
. . . . . .

['Lycoperdium or Phallus 647' in margin] Nearly all my specimens are in their young state.—They then look like the bulb ['of' marked out] from which the Phallus springs. only with the difference. that the outer coat is penetrated with apertures.—This outer coat seems to expand, untill it becomes a bag of trellis work.—There is a fragment showing this structure.—They are of a salmon colour.—but through the aperture the internal parts. are brownish green.—They grow on the sand dunes & near to a Phallus. but appear to be uncommon.—Did not possess any strong odour.—

The above are the only collections in the first *Specimens in Spirits of Wine Notebook* marked by Darwin with a pencilled 'P'. The second notebook has written in ink on its cover by Darwin, 'Catalogue for Specimens in Spirits of Wine.——No. 661——1346'. Those collections in this notebook so marked follow.

1833 June.——Maldonado

712 Phallus growing on sand dunes

Marked with an 'x'. Noted on the opposite page is, '712 Head with much [unknown word] & thick; fluid smell but little offensive——'. *Phallus campanulatus* Berkeley, 1842 *Ann. Mag. Nat. Hist.* 9:446. (Phallaceae): 'On sand-dunes. Maldonado. June 1833.' Illustrated by Berkeley on plate X, and the type specimen, but I did not find it.
On the margin of this page is written 'Halimid. V 211'; see number 807 below for a discussion of this collection.

1833

754 Lycopodium. [i.e., *Lycoperdon*] growing on the most dry part of the camp. [i.e., 'campo', country] R. Negro [i.e., along the Río Negro, Argentina]

Bovista cervina Berkeley, 1842, *Ann. Mag. Nat. Hist.* 9:447. (Lycoperdaceae); type specimen at K ('Bovista cervina, Berk. Rio Negro. R. Patagonia. C. Darwin').
Cited by Berkeley: 'Driest part of plains. Rio Negro, Patagonia. 1833.' Listed by Kreisch (1967: 172) as '*Disciseda cervina* (Berk.) Holl.' In 1833 Darwin was on the lower Río Negro from 3 to 11 August.

1834 Jan:

794 Cactus & plant growing near the Salinas [i.e., saltflats].——Port St. Julian [i.e., Puerto San Julián, prov. Santa Cruz, Argentina]

A note on the opposite page reads: 'The Cactus from Port Desire [i.e., Puerto Deseado, prov. Santa Cruz]. The stamens when touched collapsed rapidly & with force on the Pistol; as also did the Petals, but in a less sudden manner.——' The cactus is *Tephrocactus darwinii* (Henslow) Backeberg (Cactaceae), but the plant from Puerto San Julián is unidentified. I did not find either of them. In describing *Opuntia darwinii*, Henslow (1837: 467) wrote:

I have named this interesting Cactus after my friend C. Darwin, Esq. who has recently returned to England, after a five years absence, on board his H.M.S. Beagle, whilst she was employed in surveying the southernmost parts of South America. The specimen figured was gathered in the month of January, at Port Desire, lat. 47° S. in Patagonia. He recollects also to have seen the same plant in flower as far south as Port St. Julian in lat. 49° S. It is a small species growing close to the ground on arid gravelly plains, at no great distance from the sea. . . . He had intended to produce fresh specimens on the following day, and returned to the

ship with the one now figured, but unfortunately she sailed immediately afterwards, and he was prevented from obtaining any more.

The *Beagle* sailed from Puerto Deseado twice in January, on the fourth and on the twenty-second. Given Henslow's comment above, this cactus must have been collected on either the third or the twenty-first.

797 Cellaria: very pale "Vermillion red": ['Vermillion red' is repeated between the lines in pencil] Sea-weed (same colour. best seen near extremities of branches: Coralline [unknown word] Is. dark "crimson red" (with flat articulations.——[marked with an 'x'.]

'1529' is written in pencil between the lines; a circled 'D', indicating that these algae are preserved in jar D, and 'Port Desire' (i.e., Puerto Deseado, prov. Santa Cruz, Argentina) are written in the margin of the page. 'Cellaria' and 'Sea-weed' are unidentified, presumably red algae (Rhodophyta); if the 'Corallina' is the same as number 1529, it is *Bossea oribigniana* (Decaisne ex Harvey) Manza (described in the previous section of this paper). None of these specimens were found.

1834 Jan: Sts. Magellan.——

807 Sea-weed V 211

Perhaps this is *Polysiphonia berkeleyi* (Montagne) Harvey (Rhodomelaceae), a specimen of which is discussed in the previous section.
The collection discussed by Darwin on page 211 of the *Zoological Diary* certainly could be this species:

1834 Jan: Port Desire

. . . . . .

['*Sea-weed*' in margin] First narrows St. of Magellan; Branches very fine bifurcata. colour. "Hyacinth red with little Aurora" Extremities of branches finely pointed. with transverse divisions; shortly then are divided by longitudinal plates making double set of cells. as long as broad.—in mains stems. 6 or (10?) oblong cells. six times as long as ['(a)' in margin] broad; [Note a is given on p. 211, *verso*: '(a) Stem enveloped by fine transparent epidermis seen at junction of cells.—' The page is marked with a vertical pencil line.] side by side, extremities of cells not united in a straight transverse line; at ['stem' added] junction of ends

Page 212 continues:

1834 Jan:

of these oblong cells. there are small globular ['*Sea-weed*' in margin] bodies.—Many of the branches are changed into a short. bluntly pointed. very slightly oval cases.—this at first is full of red pulpy matter. which subsequently contracts & forms only 1/4 of bulk at upper extremity.—in this state it is an aggregation of small spheres. which in a more mature state. are quadrified. that is they present the appearance of four short. mushrooms growing from a common central root, (a flattened head on short footstalk) These are enveloped in a transparent case; which nearly fills up the small vacuity between the separate divisions.—diameter ['of whole' added in margin] .0025 or rather more than 1/500th of an inch.—color. dark red.—Are there four eggs or one singularly shaped one?—

The section on page 211 has been marked 'Copied' in pencil in the margin. The *Beagle* was in the Straits of Magellan from 26 January through 13 February 1834.

808 Sea-weed; 1t [i.e., first] Inarticulate, "Hyacinth with little Arterial Blood red": 2d. with capsules or ovules on sides of branches pale "Hyacinth red." Main stems with much green: 3d. finally pinnate rather more "Art. Blood red" than in 1t.: Conferva. bright "Jap green."—

I did not find any of these specimens. The first three probably were red algae (Rhodophyta), the 'Conferva' a green alga (Chlorophyta).

809 1t. [i.e., first] Very finely pinnate, "cochineal with "Hyacinth red": 2d inarticulate brownish "sulphur yellow": 3rd with necklace-like stem, brownish "wax yellow": 4th a Corralline. This & former [i.e., number 808] St. Gregory Bay. [i.e., Bahía San Gregorio, prov. Magellanes, Chile] St. of Magellan February 15

None of these were found. The first and fourth certainly were red algae, the second and third brown algae (Phaeophyta).
The date probably should be 12 February, as Darwin recorded in his *Diary* that he was at Bahía San Gregorio on that date and on the east coast of Tierra del Fuego the fifteenth.

811 Plants. Elisabeth Island: [i.e., Isla Isabela, prov. Magellanes, Chile] [unknown word] (?) plants. "dutch orange"; hinder surface shaded ['mottled' marked out] [From the description, this is *Calceolaria darwinii* Bentham (Scrophulariaceae), the type of which (not this specimen) was collected by Darwin on Isla Isabela.] with 'brownish orange' Beneath upper white tip, space [Marked with an 'x'.]

A note is written on the facing page: '811 mottled with the richest "brownish orange."——curious appearance Orchis. 5 outside petals veined with "duck green": head of stamens (?) on anterior petals (?). green on yellow margin: two [unknown word] in center of flower surrounded by space of fine yellow——'. According to Darwin's *Diary*, the Beagle was at Isla Isabela on 30 January. On 31 January he wrote:

> The country in this neighbourhead may be called an intermixture of Patagonia & Tierra del Fuego; here we have many plants of the two countries, the nature of the climate being intermediate: a few miles to the South the rounded slate hills & forests of evergreen commence. The country is however, thoroughly uninteresting.

1834 Sts of Magellan

816 Sea-weed. dark "olive green"

A brown alga (Phaeophyta); no such specimen was found.

821 Esculent parasitical balls on the Beech. do [i.e., ditto, 'P. Famine', Port Famine or Puerto Sacrificios, prov. Magellanes, Chile]

Presumably a species of *Cyttaria* (Cyttariaceae); no specimen with this number was found.
Darwin's *Diary* places him at or near Puerto Sacrificios from 2 through 10 February.

823 Orchis. Petals all white, 2 central & anterior ones spotted with purple [Marked with an 'x'.]

From the description of the petals, this is *Codonorchis lessonii* (D'Urville ex Duperrey) Lindley (Orchidaceae), one of the five species of orchids known from Tierra del Fuego (Moore, 1983).
A note is written on the facing page: '823. The orchis inhabits the darkest forests: Lichen on rock common pale green (Lichen colour) [unknown word] beautiful "Vermillion & Arterial Blood red" Port Famine'. The lichen and presumed fungus are unidentified. No specimens were found.

1834 Port Famine [i.e., Puerto Sacrificios, prov. Magellanes, Chile]

825 Orchis. very shady damp wood no leaves [Marked with an 'x'.]

Codonorchis lessonii (Orchidaceae).
A note on the facing page reads: '825 white. 2 central & interior petals white spotted with purple.——'

1834 May Santa Cruz [prov. Santa Cruz, Argentina]

964 Fucus (?). "Blackish Br." [unknown word or words] near root [?]. "Yellowish Br." This [continued on facing page: '964. curious substance was abundant in 8 Fathoms, on rock off Sts. of Magellan.——' Marked with an 'x'.]

Presumably a brown alga (Phaeophyta); I found no specimen. This and the next probably were collected during the second week in May, when the *Beagle* was in transit between Santa Cruz and Tierra del Fuego.

1834 May

969. Sea-weed. color same as common red, delicate sea-weeds: All these came from rocky bottom 8. Fathoms off Sts of Magellan.——[Marked with an 'x'.]

Noted on the facing page is '969. There are small Ascidia [bryozoans] the greater half of which are coloured pale "Vermillion R." [i.e., red].——'. None of these presumed red algae (Rhodophyta) were found.

Port Famine

973 Fungus on Beech trees, [Marked with an 'x'.]

A note on the facing page reads: '973. Cup shaped: bright. "Dutch with little [unknown word] O." internal surface, with down like green-gage'. Cited by Berkeley (1842: 446) as '*Exidia auriculata judae*, Fr.' and J. D. Hooker (1847: 449) as '*Exidia auriculata judae*, Fries', the correct name is *Auricularia auricula* (Hook.) Underwood (Auriculariaceae) (Miller & Farr, 1975). I did not find the specimen. The *Beagle* returned to Puerto Sacrificios on 1 June, remaining until the eighth.

1834 ['June' marked out and 'M' added]. *Port Famine.*——

984 Fungi (esculent) V 147(a).——

i.e., see note a on page 147 in the *Zoological Diary*, given above in the discussion under number 528. Like the latter, also *Cyttaria darwinii* Berkeley, but this specimen was not found.

1834 Sept.–Oct. Valparaiso [Chile]

1065 Edible Fungus on the Roble. [*Quercus* sp. (Fagaceae)] V 281

Cyttaria berteroii Berkeley, *Trans. Linn. Soc.* 19:41, 1845 (Cyttariaceae); I did not find this collection, which is the type.
The following notes are from page 281 of the *Zoological Diary*; they are printed, with some additions and corrections, in Berkeley (1845: 39):

1834 September Chile

['Fungus on Roble' in margin] On the hills near Nancagua & S. Fernando ['Nancagua and San Fernando' written above] there are large woods of Rolbe ['Roble' written above] or the Chilian oak; I was surprised to find ['I found on it' in Berkeley] a yellow fungus, ['1065 number on Specimen' in margin] very closely resembling the "edible ones" on the Beech of T. del Fuego. Speaking from memory the differences consist ['difference consists' in Berkeley] in this ['these' in Berkeley] being rather [omitted in Berkeley] paler colored, but the inside of the little [omitted by Berkeley] cups ['of' added in Berkeley] a darker orange. the greatest difference is however in the more irregular shape, in place of ['the' marked out and 'being' added in pencil] spharical ['one' marked out in pencil and 'as' added in pencil] ['of' marked out in pencil] T. del F['uego' added]. ['as' to 'Fuego' omitted in Berkeley] They are also much larger: many are 3 times as large as the largest of my ['Fuegian' added in Berkeley]

specimens.—The footstalk appears longer, this is necessary from the roughness of the bark. ['of the trees on which they grow' added in Berkeley]—In the young state, there is an internal cavity.—The difference of tree & *great* difference in climate renders it certain that the Fungi must be distinct. [sentence omitted in Berkeley]—They are occassionly eaten by the poor people.—I observe these Fungi are not infested with Larva (so as to render their origin doubtful) [phrase in parentheses omitted in Berkeley] as ['like' in Berkeley] those of T. del Fuego.—

'Copied' is written in the margin in pencil, and was later marked out. This is further evidence that a list of plants in spirits of wine was prepared. In his *Diary*, Darwin recorded being in Rancagua (the correct spelling), prov. Santiago, on 6 September.

1834 Arch. of Chiloe [i.e., Archipiélago de Chiloé, Chile]

1102 Necklace-like bright green Conferva: do: [i.e., ditto, 'C. Tres Montes', Cabo Tres Montes, prov. Aisén, Chile]

This may be *Chaetomorpha darwinii* (Hook. f.) Kützing (Cladophoraceae, Chlorophyta) or *Stypocaulon funiculare* (Montagne) Kützing (Sphacelariaceae, Phaeophyta), both discussed in the preceding section of this paper. I did not find either collection. Cabo Tres Montes was visited on 31 December.

1834 Decemb. Id. of Inchy [i.e., Isla Ynche, prov. Aisén, Chile]

North part of Tres Montes

1111. Fungus, disc bright scarlet, bordering hairs [?] Dark: growing on wood in the west [?] within shade [?] in forest.——

Reported by Berkeley (1842: 446): '*Peziza scutellata*, L., Darw. No. 1111. On rotten wood in a forest. I. of Inchy, N. of Cape Tres Montes. 1834.' The correct name is *Scutellinia scutellata* (L. ex Fr.) Lambotte (Pyronemataceae) (Miller & Farr, 1975). I did not find this collection. Darwin collected on Isla Ynche on 30 December.

1835 Jan

1142 Potatoes. (wild). Lowes Harbour Chonos A. [i.e., Archipiélago de los Chonos, prov. Chiloé, Chile. Marked with an 'x'.]

'1142 V 314' is written on the facing page. Page 314 of the *Zoological Diary* discusses this collection and dried collection number 2528 (*Solanum tuberosum* var. *vulgare* Hook. f., Solanaceae) and is given above in the first section of this paper. I did not find collection number 1142. The *Beagle* was at Lowes Harbour 7 through 14 January.

Otahite [i.e., Tahiti]

13223 [i.e., 1322 and 1323] Sea-weed (& minute club-headed Coralline) growing on the reef. greenish [unknown word].

I found no specimens bearing these numbers. They are mentioned by Darwin (1842) in his discussion of the coral reefs of Tahiti. The *Beagle* was here 16 through 26 November. He visited the reef on the twenty-second.

The following collections are those marked with a 'P' in the third *Specimens in Spirits of Wine* notebook. It is titled 'Catalogue for Specimens *in Spirits of Wine*' on the front cover in ink in Darwin's hand.

1835 April. Keeling Is. .——[i.e., Cocos-Keeling Islands]

1416 2 species of sea-weed from holes in the reef. The one with a reticulate structure grows in square pyramidal leaves or masses in little tufts. is colored with the same red; as common to Fuci: the other species. common. is of a reddish Salmon color:

I did not find either collection, which presumably are red algae (Rhodophyta).
The Cocos-Keeling Islands, which figure so importantly in Darwin's studies on coral reefs, were visited during 1–12 April.

1421 Seaweed. pale green: a fragment of a kind growing like a Lichen

Probably a green alga (Chlorophyta); I did not find it. It and the species of numbers 1416 are mentioned by Darwin (1842) in his discussions of the coral reefs of the Cocos-Keeling Islands.

1836

1465 Flower & leaves of a low shrubby tree growing on the hills: flower singular dirty white. petals fleshy. Cape de Verd. St. Jago. [i.e., São Tiago] August, end.

No such collection was found.
The *Beagle* visited Proto Praya during 31 August–4 September 1836, toward the end of Darwin's voyage.

The last two entries for plants are in pencil and were added at the end of the voyage. They appear to be for collections made earlier, misplaced, and refound.

1493 (no [i.e., number?] lost) Lycopodium [i.e., *Lycoperdon*] Maldonado? [Uruguay]

Geastrum saccatum Fr. (Geastraceae). Cited by Berkeley (1842: 447) as 'No. 664. 1493.' (see introduction to the first section of the present paper for a discussion of number 664).
Perhaps number 1493 was substituted for number 664 when the latter was lost from the specimen (specimens in spirits had numbered metal tags attached to them). However, it is just as likely that it was never tagged until number 1493 was attached. The specimen at K does not bear a number.

1497 (797) Sea-weed Port Desire [i.e., Puerto Deseado, prov. Santa Cruz, Argentina]

This probably is the 'Sea-weed' listed above under number 797, which has been separated from the two other specimens and given its own collection number. I did not find it.

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Charles Darwin's Notebooks, 1836–1844

TRANSCRIBED & EDITED BY

Paul H. Barrett — Michigan State University
Peter J. Gautrey — Cambridge University Library
Sandra Herbert — University of Maryland, Baltimore County
David Kohn — Drew University
Sydney Smith — St Catharine's College Cambridge

Darwin's notebooks provide an invaluable record of his scientific thinking and, most importantly, the development of his theory of natural selection. This edition of the notebooks, prepared to the highest modern standards of textual editing, thus affords a unified view of Darwin's professional interests.

The *Red Notebook*, used on the voyage of H.M.S. *Beagle* and afterwards in England, contains Darwin's first evolutionary statements. In July of 1837, Darwin began his 'Transmutation Notebooks' (B–E) devoted to the solution of the species problem, and in the third notebook of this series he first formulated the theory of natural selection. To this can now be added another species notebook reconstructed from loose sheets; this 'Torn-Apart Notebook' represents the fifth Transmutation Notebook.

This volume also contains Notebook A on geology, Notebooks M and N on man and behaviour, and other notebook and manuscript materials from the period 1836–1844.

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Ed. Kenneth G. V. Smith

Darwin notes on *Beagle* plants
Ed. D. Porter

Facsimile reproduction of **Memorials of Charles Darwin**
A collection of manuscripts, portraits, medals, books and natural history specimens to commemorate the centenary of his birth and the fiftieth anniversary of the publication of *The Origin of Species*
Introduction by S. Smith

Printed in Great Britain by Henry Ling Ltd., at the Dorset Press, Dorchester, Dorset

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Facsimile of Memorials of Charles Darwin

A collection of manuscripts, portraits, medals, books and natural history specimens to commemorate the centenary of his birth and the fiftieth anniversary of the publication of The Origin of Species

British Museum (Natural History) Special Guide No. 4
Second edition, 1910

Historical series Vol 14 No 3 12 February 1988

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Facsimile of *Memorials of Charles Darwin*

A collection of manuscripts, portraits, medals, books and natural history specimens to commemorate the centenary of his birth and the fiftieth anniversary of the publication of *The Origin of Species*.

Introduction by Sydney Smith

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INTRODUCTION

Sydney Smith
St Catharine's College, Cambridge

When writing the 'Historical Preface' to *Charles Darwin's Notebooks 1836–1844,* recently published by Cambridge and Cornell University Presses in association with the British Museum (Natural History), I remarked how valuable to me the long out-of print *Memorials of Charles Darwin* (British Museum (Natural History) Special Guide No. 4, 1909; reprinted 1910, price sixpence) had proved to be. As it happened, Volume 14 of the Historical Series in the Museum's *Bulletin* contained two papers, 'Darwin's Insects' by K. G. V. Smith and 'Darwin's notes on Beagle plants' by Duncan Porter and it was suggested that a facsimile reprint of the 'Memorials' might prove to be a fitting salute to the publication of the 'Notebooks'.

Special Guide No. 4, entitled *Memorials of Charles Darwin* was originally published to accompany an exhibition in the British Museum (Natural History) set up in July 1909 under the direction of Sidney Harmer, Keeper of Zoology. Why was this exhibition held, and why is the Guide still of value to Darwin scholars?

The year 1909 was memorable on two accounts in relation to Charles Darwin: not only was it the centenary of his birth, but also fifty years since the first publication of the *Origin of Species.* By 1859 Darwin was already established as a successful and respected author, but it is the *Origin* which is rightly considered his masterpiece and which, since publication, has assumed such dominance that the scale and range of Darwin's other achievements, which are formidable, have dropped into relative obscurity. It is in this latter area that these 'Memorials' are so valuable. They give details, backed by objects collected, seen, commented upon and used by Darwin, which stand by themselves and attest to his versatility and range of enquiry.

It was in 1907 that the Council of the Senate of Cambridge University appointed a committee to *consider what steps should be taken to celebrate in 1909 the centenary of the birth of Charles Darwin.* June 22–24 was decided on, the University Chest promised £500 towards expenses, and an anonymous gift of a further £500 launched the project. Francis Darwin prepared a transcript of the 1842 pencil sketch of the 'Origin' and signed personal copies were to be given to each Delegate.

In 1908 The Linnean Society had celebrated the fiftieth anniversary of their publication of the Darwin-Wallace paper (1858) in the *Transactions,* so by 1909 anniversaries were already in the air. The world of scholarship was invited to Cambridge from June 22 to 24, 1909. Speeches were delivered, Honorary Degrees conferred, and receptions and banquets attended. Darwin's old college, Christ's, gave a garden party at which guests were entertained to a selection of the music by composers such as Sullivan, Mendelssohn, Grieg and others performed by a band of H.M. Royal Marines, and on the last afternoon Darwin's surviving children and grandchildren entertained the Delegates in Trinity Fellow's Garden.

An exhibition of Darwin memorabilia was arranged in the old library at Christ's College; Darwin's old rooms at Christ's were open to visitors during the afternoons of June 23–24 and the morning of June 24; the University's Museum of Zoology displayed Darwin's collection of *Beagle* fish; and his rock specimens were exhibited in the Sedgwick Museum. Darwin's working library, which had been presented to The Professor of Botany (A. C. Seward) in 1908 by Francis Darwin, was arranged on the shelves in the Botany School Library, and could be viewed by Delegates on application.

It was after these celebrations that Sidney Harmer, Keeper of Zoology at the British Museum (Natural History), mounted an exhibition, 'Memorials of Charles Darwin'. Harmer had been Superintendent of the Cambridge University Museum of Zoology and had transferred to South Kensington in 1907.

Sidney Fredrick Harmer* was born in 1862. He studied at University College London before moving to King's College, Cambridge in 1881. He was awarded a Fellowship in 1886 having undertaken research on Polyzoa, microscopic, colonial, marine and freshwater organisms. This work secured his succession as Superintendent of the Museum of Zoology in 1892 following the retirement of John Willis Clark. He was awarded his Sc.D. in 1897 and was, with A. E. Shipley, editor of the *Cambridge Natural History* (1895–1909). Harmer continued his work on Polyzoa and greatly enriched the Museum's Invertebrate Collection. It is interesting to note that Harmer also worked on whales, and had published with T. Southwell in 1895 an account of a Sowerby's whale stranded on the Norfolk coast.

The Museum of Zoology had received in 1870 from Charles Darwin through his son Francis, then an undergraduate at Trinity, four jars of marine invertebrates in spirit collected during the *Beagle* voyage. In 1891 Harmer had borrowed from Francis Darwin the still unpublished Darwin manuscript notes on living marine invertebrates and his observations on microscopic marine organisms, written while at sea on the *Beagle* voyage.†

It was in 1901 that Harmer set to and catalogued this material. The collection had already been picked over by specialists in the immediate post-voyage period and, though much had decayed with the passing of time, Harmer sorted out those still recognizable specimens which agreed with the numbers in the Zoology manuscript. He transcribed these notes and managed to extract specimens of marine Polyzoa which were good enough to be set up under a microscope and which were included in the exhibition 171B, page 33 of the Guide.

As soon as the Cambridge celebrations finished selected items from the various exhibitions must have been transferred to South Kensington under the direction of Sidney Harmer. Additional material was added from the Museum's own holdings and loans by staff, family and other institutions. Darwin was both meticulous and generous with his collections which he wished to be available to others in order that they might confirm or query the interpretation he put upon them. His fossil mammal finds in South America, sent to the Hunterian Museum of the Royal College of Surgeons, had been a matter of excited comment before his return to England in 1836.

So the specimens exhibited in 1909 were indeed a true memorial of Darwin as much if not more so than the manuscripts, books, letters, apparatus he used, and furniture later ceded to the public to establish and equip Down House.

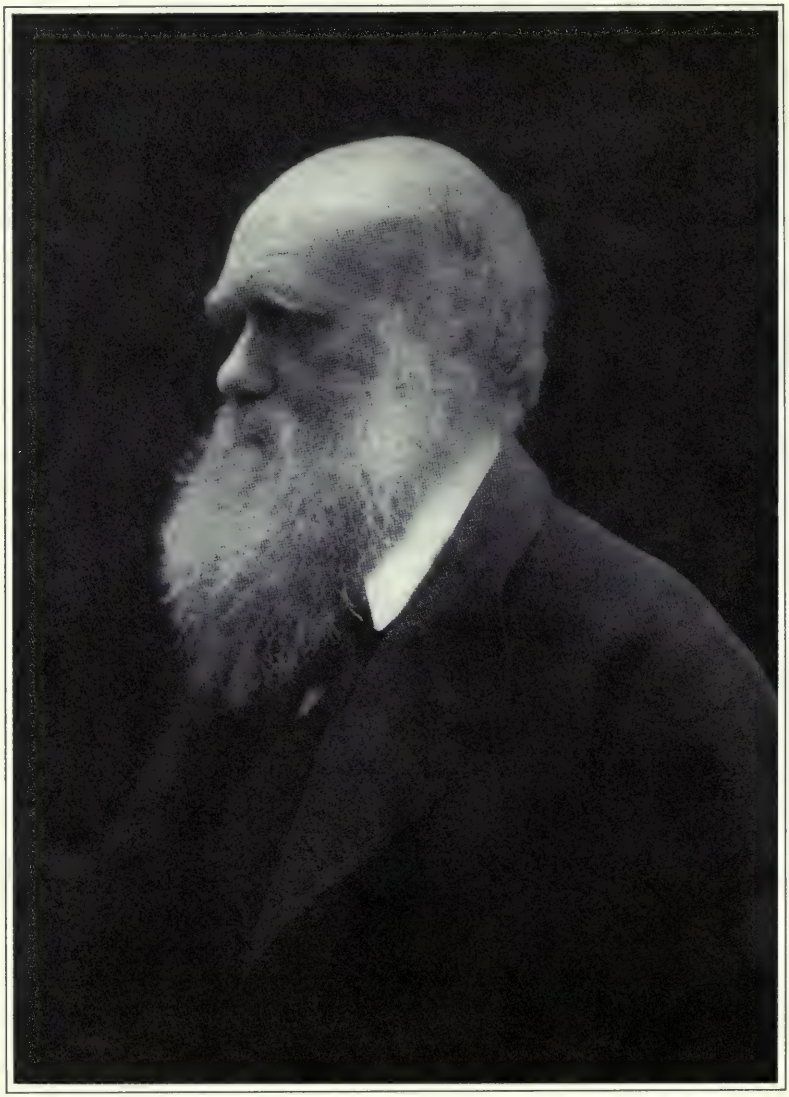
Although the *Memorials* detail the donor of each exhibit of 1909, not all can be found today. Most of Darwin's material is either in the British Museum (Natural History), Hunterian Museum of the Royal College of Surgeons or the Museum of Zoology, Cambridge. The Darwin Archives at Cambridge University Library hold all the Darwin research manuscript papers and the majority of letters, while Down House has the *Beagle* manuscript, pocket notebooks and his Diary written during the voyage, Darwin's domestic and personal papers, and memorabilia such as his accounts and his 'Health Diary'.

It is interesting to note that items 10 & 13 on pages 8 & 9 of the Guide are two Darwin letters to G. R. Waterhouse written in the summer of 1843 and loaned by his son C. O. Waterhouse, both members of the BM(NH) staff. In July, 1978 these letters were offered for sale by Sotheby's and were subsequently obtained for the University Library, Cambridge and are now included in the Darwin Archives.

A short introduction such as this is not the place for a formal bibliography but may I direct anyone who wishes to follow through the avenues of Darwin's investigations to the ongoing publication of *The Correspondence of Charles Darwin* (Vol 1, 1985; Vol 2, 1986; Vol 3, 1987. Cambridge University Press); *Charles Darwin's Notebooks 1836–1844* (Cambridge University Press & Cornell University Press, 1987), the latter contains a splendid bibliography; and to this Guide which confirms the wide variety of Darwin as a researcher.

*Superintendent Cambridge University Museum of Zoology	1892–1907
Keeper of Zoology, British Museum (Natural History)	1907–1921
Director, British Museum (Natural History)	1919–1927

†The Zoology notes of the voyage, especially observations on living plankton at sea, are still unpublished and have been written up by Phillip R. Sloan 'Darwin's Invertebrate Program, 1826–1836' *in* David Kohn (Ed.) *The Darwinian Heritage*: 71–120. New Jersey: Princeton University Press.



CHARLES DARWIN.

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BRITISH MUSEUM (NATURAL HISTORY)

SPECIAL GUIDE No. 4

MEMORIALS OF CHARLES DARWIN

A COLLECTION OF MANUSCRIPTS PORTRAITS MEDALS BOOKS AND NATURAL HISTORY SPECIMENS TO COMMEMORATE THE CENTENARY OF HIS BIRTH AND THE FIFTIETH ANNIVERSARY OF THE PUBLICATION OF "THE ORIGIN OF SPECIES"

(SECOND EDITION)

LONDON
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1910

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PREFACE.

BY a coincidence rare in the records of previous celebrations, the year 1909 is at the same time the hundredth anniversary of the birth of a great man and the fiftieth anniversary of the completion of his greatest work. Charles Robert Darwin was born in 1809, and the "Origin of Species" was published in 1859. In recognition of this double motive for signalising the present year, the Trustees directed that an exhibition should be prepared of specimens, autograph letters, books and portraits relating to Darwin.

It is not the part of a Museum to endeavour to decide whether the share ascribed by Darwin to the operation of Natural Selection in the evolution of animals and plants was or was not correctly estimated. Some of the leading Biologists of the present day are in this respect even more Darwinian than Darwin himself, while others attribute less importance than he did to the principle of Natural Selection. But whatever view may be taken of this question, the magnitude of Darwin's influence on contemporary thought can hardly be overestimated, and the desirability of illustrating his teaching can scarcely be questioned.

Without necessarily implying any expression of opinion on controversial matters, it has thus seemed best to illustrate some of Darwin's arguments by means of specimens, using as far as possible the species to which he himself referred in his writings, and in some cases the material which actually passed through his hands. In this part of the Exhibition, the attempt is made to place before the public a few selected examples, to enable those who read Darwin's works to see some of the evidence on which he relied. The "Origin of Species" was naturally chosen in the first instance for illustration: though references to other works are given here and there. Possibly some few of the illustrations may not be well known even to experienced Zoologists and Botanists. It should be understood that the

exhibition makes no claim to be regarded as more than a very small selection, not to be taken as a complete illustration of Darwin's work.

Another set of specimens has a more personal interest, since they were collected by Darwin or are known to have been studied by him. With these may be noticed some of Darwin's apparatus, and a glance will show how simple were the tools with the aid of which his most famous observations were made.

The selection of autograph letters includes some of special interest. Attention may be directed to Nos. **1**, **3**, **2**, in the catalogue, consisting of Professor Henslow's invitation to Darwin to take part in the *Beagle* voyage, of Darwin's summary of his father's objections to the proposal, and of Josiah Wedgwood's reply to those objections. The characteristic and remarkable letter from Huxley (No. **18**), written immediately after his first perusal of the "Origin of Species," is one that specially deserves attention.

The exhibition further contains a number of portraits of Darwin, one or two medals founded in his honour, and copies of his printed books. With these are shown a few works, such as those by Haeckel, Weismann and others, which have special reference to Darwin's theories. It will readily be understood that these do not pretend to constitute more than a fraction of the enormous literature that has sprung into existence as the result of the publication of the "Origin of Species."

The greater number of the specimens and books, and a few of the MSS. are the property of the British Museum. For other specimens, as well as for most of the MSS. and portraits and for a few of the books, the Museum is indebted to the owners whose kindness in lending the relics is acknowledged in the pages of this Guide. Special thanks are due to the Council of the Royal College of Surgeons for their loan of the fossils collected by Darwin in South America; and to Mr. William Darwin, Professor Sir George Darwin, K.C.B., F.R.S., Mr. Francis Darwin, F.R.S., Major Leonard Darwin, and Mr. Horace Darwin, F.R.S., for various objects connected with their father's life. To Mr. J. C. Simpson, of Emmanuel College, Cambridge, the Museum is specially indebted for having made arrangements which facilitated the borrowing of some of the objects which were exhibited at Cambridge in June.

In the following catalogue of the exhibits, the source from which the object was obtained is indicated in the case of every specimen or paper borrowed for the occasion. The absence of any such acknowledgment may be taken to imply that the object belongs to the British Museum.

Preface. v

The frontispiece of this Guide is a reduced reproduction of a photograph taken about 1868 by Mrs. J. M. Cameron, Freshwater, Isle of Wight, lent for the purpose by Mr. Francis Darwin, and published by kind permission of Mr. John Murray. The other plate, facing page 7, is a photographic reproduction of the statue of Darwin, by Sir J. E. Boehm, R.A., on the main staircase at the North end of the Central Hall.

The arrangement of the specimens for exhibition and the preparation of this Guide-book are the work of Dr. W. G. Ridewood.

SIDNEY F. HARMER,
Keeper of Zoology.

July, 1909.

PREFACE TO THE SECOND EDITION.

THE fact that a Second Edition of this Guide-book is required less than six months after the publication of the First Edition is evidence of the interest that has been taken in the Darwin Exhibition.

A Table of Contents has been added, and a few verbal alterations have been made by Dr. W. G. Ridewood, the author of the First Edition.

SIDNEY F. HARMER.

BRITISH MUSEUM (NATURAL HISTORY),
LONDON, S.W.

February, 1910.

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For particulars of Cases other than those mentioned above, see the List on pages 4–6.

LIFE OF DARWIN.

CHARLES ROBERT DARWIN was born at Shrewsbury on February 12th, 1809. He was the son of Robert Waring Darwin, a Doctor of Medicine of Shrewsbury, and grandson of Dr. Erasmus Darwin, poet and philosopher, probably best known as the author of "Loves of the Plants." On leaving the Grammar School at Shrewsbury in October, 1825, Darwin went to Edinburgh University to study medicine. His father, however, perceiving that he did not relish the idea of becoming a physician, proposed that he should become a clergyman, and with that intent Darwin went to Cambridge early in 1828, and remained there three years. He left Cambridge to join the *Beagle* as naturalist of the expedition, and was away from England from December, 1831 to October, 1836.

On his return from the *Beagle* voyage Darwin settled in Cambridge, and in March, 1837, took lodgings in Great Marlborough Street, London, where he stayed two years till his marriage in January, 1839. He married his cousin, a grand-daughter of Wedgwood, the famous potter. He had by this time finished the "Journal" of the *Beagle* voyage (republished later as "A Naturalist's Voyage Round the World"), and was preparing his "Geological Observations," which were produced in the form of three books, in 1842, 1844 and 1846 respectively; and he was also engaged in editing the "Zoology of the Voyage of H.M.S. *Beagle*," which appeared in five parts between 1839 and 1843. He lived in Upper Gower Street from January, 1839, to September, 1842, when he moved to Down, in Kent, where he remained for the rest of his life. In October, 1846, he began his study of the Cirripedia, upon which he wrote four volumes (1851–1854).

The idea of selection by nature had been working in his mind since the voyage of the *Beagle*. The succession of the great extinct Edentates of the Pampas of Argentina by the modern Armadillos, and the peculiarities of the fauna of the Galapagos Archipelago, the productions of each island of which differ slightly

from those of the other islands, pointed to species being capable of modification, in a gradual manner. But he admitted to being puzzled by structural features specially adapted to habits and surroundings, such as the modification of the feet and tail-feathers of the woodpecker for climbing trees, and of hooks and plumes of seeds for dispersal. He commenced to accumulate a vast mass of evidence to show the extent to which artificial selection by man has resulted in the production of varieties among domesticated animals and cultivated plants, and in 1838, after reading the "Essay on the Principles of Population," by Thomas Malthus, in which the struggle for existence among human beings is clearly set forth, he conceived the idea that a similar struggle among animals and plants had led to the extinction of those individuals which were least fitted to their environment, and that by differentiation, resulting from the action of different environmental conditions on organisms at first similar, new species had come into existence. In June, 1842, he first committed his ideas on the subject to paper, and this first draft, of thirty-five pages, he rewrote and expanded to 230 pages in 1844.

When it became known in 1858 that Alfred Russel Wallace had independently arrived at somewhat similar conclusions, it was arranged by Lyell and Hooker that Darwin and Wallace should expound their views jointly at a meeting of the Linnean Society. The title of the joint paper was "On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection."

In the following year Darwin produced his "Origin of Species," a book which in his autobiography of 1876 he admits to be the chief work of his life. The first edition (1250 copies) was sold out on the day of its production, November 24th, 1859, and Darwin immediately set to work to revise the book for a second edition, which appeared on January 7th, 1860, and consisted of 3000 copies. The sixth and last edition was published in January, 1872, and of this numerous reprints have been issued.

In 1860 Darwin began arranging his notes for the "Variation of Animals and Plants under Domestication," a work which appeared in 1868. In 1862 he published his book on the "Fertilisation of Orchids," and afterwards his papers, read before the Linnean Society, on dimorphism in *Primula* and trimorphism in *Lythrum*. His paper on "Climbing Plants" in 1865 was reproduced in book form in 1875.

He published the "Descent of Man" in 1871, the "Expression of the Emotions" in the autumn of 1872, "Insectivorous Plants"

in 1875, the "Effects of Cross and Self Fertilisation in the Vegetable Kingdom" in 1876, the "Different Forms of Flowers on Plants of the Same Species" in 1877, the "Power of Movement in Plants" in 1880, and the "Formation of Vegetable Mould through the Action of Worms" in 1881.*

Darwin was awarded the Royal Medal of the Royal Society in 1853, and the Copley Medal in 1864, and the Wollaston Medal of the Geological Society in 1859. He died at the age of 73 on April 19th, 1882, and was buried in Westminster Abbey.

* A complete list of Darwin's books and his contributions to scientific periodicals is to be found at the end of the third volume of the "Life and Letters of Charles Darwin," by his son, Francis Darwin, 1887.

DARWIN EXHIBITION.

LIST OF CASES, IN NUMERICAL ORDER.

The special cases containing the specimens illustrative of Darwin's life and work are indicated by pale green labels. To facilitate the finding of any particular case they are numbered in as consecutive a manner as their positions will permit. It is not recommended, however, that the visitor should proceed from case to case in the numerical sequence; it is intended that the exhibits shall be reviewed in the order in which they are referred to in the descriptive "List of Exhibits" (p. 7 *et seq.*).

Case **1.** A large frame on the right-hand side of the Eastern * arch leading to the North Hall, containing Manuscripts of Darwin.—pp. 7–11, Nos. **1–24.**

Case **2.** The North wall-case of Bay VI,† containing a series of Burrowing Animals, an illustration of "adaptive modification."—p. 31, No. **161.**

Case **3.** An upright table-case on the East side of the main staircase, containing Manuscripts and Books by Darwin, or connected with Darwin's life and work.—pp. 11–18, Nos. **25–88.**

Case **4.** An upright, shallow case set obliquely across the entrance of Bay VI, containing Medals and Portraits of Darwin, and other photographs and sketches of interest in connection with Darwin's life and work.—pp. 19–21, Nos. **89–115.**

Case **5.** A frame on the North side of the arch of Bay VII, containing a series of feathers of the Peacock illustrating "gradation in ornament." ("Descent of Man." Chap. xiv.)—p. 26, No. **129.**

Case **6.** The North wall-case in Bay VII, containing at the left-hand end and on the floor specimens collected by Darwin, or studied by him; and in the remainder of the case specimens illustrating passages in Darwin's books.—pp. 23–32, Nos. **116–140** and **148–170.**

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* The entrance to the Museum is at the *South* end of the Central Hall, and the main staircase is at the *North* end; the side of the Hall to the right of the visitor on entering is the *East*.

† The Bays or Recesses around the Central Hall are denoted by numerals. On the East side, the Bay nearest the Huxley statue is No. X, and that by the side of the main staircase is No. VI.

Case **7.** An upright table-case in Bay VII, containing specimens, chiefly Insects, illustrating protective coloration, warning coloration, and mimicry.—p. 38, No. **187** and p. 48, Nos. **240–241.**

Case **8.** A small black case containing a microscope, set on a table at the end of Bay VII. In this case are shown specimens of avicularia and vibracula of Polyzoa.—pp. 33–34, No. **171.**

Case **9.** The South wall-case in Bay VII, containing a series of specimens illustrating passages in Darwin's books, more particularly the "Origin of Species"; a continuation of the series shown in Case **6.**—pp. 28–29, Nos. **141–147** and pp. 34–41, Nos. **172–204.**

Case **10.** A frame on the South side of the arch of Bay VII, containing a series of feathers of the Argus Pheasant. ("Descent of Man." Chap. xiv.)—p. 26, No. **129.**

Case **11.** A black table-case set across the entrance to Bay VIII, containing the fossil remains of extinct Mammals collected by Darwin in South America in 1833.—pp. 21–22.

Case **12.** The North wall-case in Bay IX, containing a series of specimens in continuation of those shown in Cases **6** and **9.**—pp. 41–50, Nos. **205–251.**

Case **13.** A horizontal table-case in Bay IX, containing on the one side specimens of Cirripedia or Barnacles studied by Darwin during the years 1846–1854, and described in his monograph on that group of animals; and on the other side specimens of Corals collected by Darwin at Keeling Island in 1836.—pp. 22–23.

Case **14.** An upright case near the foot of the staircase, containing a series of Desert Animals, showing the uniform sandy coloration which renders these animals so little conspicuous in their natural surroundings.—p. 38, No. **187.**

Case **15.** An upright case containing a series of animals, principally Birds and Mammals, exhibiting albinism.—p. 39, No. **192.**

Case **16.** An upright case containing Birds and Mammals exhibiting melanism.—p. 39, No. **192.**

Case **17.** An upright case containing typical specimens of the Carrion Crow (*Corvus corone*) and Hooded Crow (*Corvus cornix*), and a map showing the distribution of each species; also examples of Birds exhibiting characters intermediate between those of the two species, obtained from a region where both species occur and interbreed. The same case contains a series of Goldfinches exhibiting characters intermediate between those of the Common Goldfinch

(*Carduelis elegans*) and the Himalayan Goldfinch (*Carduelis caniceps*), obtained from a region where the geographical areas of the two species overlap.—p. 26, No. **132.**

Case **18.** An upright case containing in the upper part the wild Rock Pigeon (*Columba livia*), and below examples of the principal breeds of domestic Pigeon, illustrating the great variation which a species may exhibit in a state of domestication by careful selective breeding. ("Animals and Plants under Domestication." Chaps. v and vi.)—p. 25, No. **128** and p. 26, No. **131.**

Case **19.** A table-case near the Owen statue, containing models and specimens illustrating the Fertilisation of Flowers. ("Fertilisation of Orchids," 1862, and "Cross and Self Fertilisation of Flowers," 1876.)—p. 50.

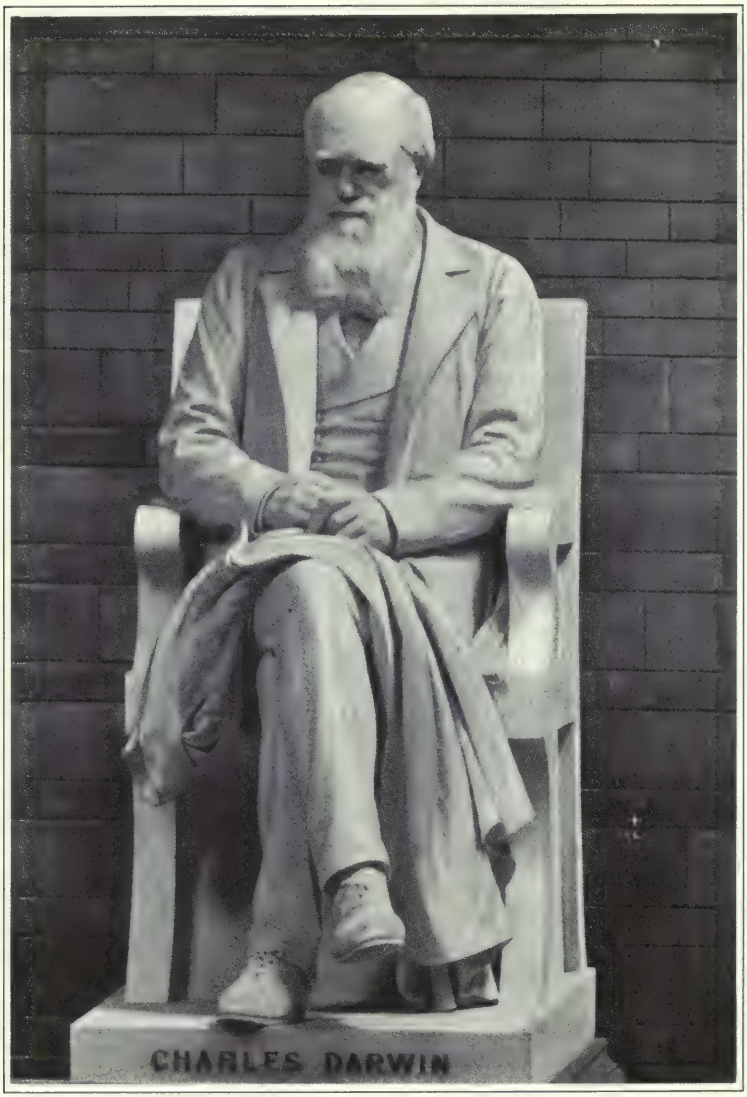
Case **20.** A table-case containing models and specimens illustrating the structure of Insectivorous Plants. ("Insectivorous Plants," 1875.)—p. 50.

Case **21.** An upright case containing examples of the Red Jungle Fowl of India, and specimens of the principal breeds of domestic Fowl, illustrating the great variation which a species may exhibit in a state of domestication by careful selective breeding. ("Animals and Plants under Domestication." Chap. vii.) The case also contains a series of wild and domestic Canaries.—p. 26, No. **130.**

Case **22.** An upright case containing Ruffs and Reeves (*Pavoncella pugnax*), showing the remarkable difference in the plumage of the two sexes, and the variability of that of the male, during the breeding season.—p. 29, No. **148.**

Case **23.** An upright case containing Drakes and Ducks (*Anas boscas*), showing the remarkable difference in the plumage of the two sexes during the breeding season.—p. 29, No. **148.**

Cases **24** and **25.** Upright cases containing Mammals and Birds from Norway, illustrating the adaptation of the colour of the coat to that of the natural surroundings, by virtue of which the animals are rendered less conspicuous to their enemies, or to their prey. In Case **24** the animals are shown as they appear in summer; in Case **25** as they appear in winter.—p. 38, No. **187.**



Statue by SIR JOSEPH BOEHM, R.A., 1885.
Photograph by MR. H. G. HERRING.

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LIST OF EXHIBITS.

STATUE.

At the top of the first flight of stairs at the North* end of the Central Hall, a sitting statue of Darwin executed by Sir J. E. Boehm, R.A., as part of the "Darwin Memorial" raised by public subscription. It was unveiled on June 9th, 1885, when an address was delivered on behalf of the Memorial Committee by the late Professor Huxley, Pres. R.S., to which His Majesty the King (then Prince of Wales), representing the Trustees, replied. A photographic reproduction of the statue faces this page.

MANUSCRIPTS.

In Case **1**, a large frame on the right-hand side of the Eastern arch leading from the Central Hall to the North Hall :—

1. A letter, dated August 24th, 1831, from Henslow to Darwin, inviting him to travel as naturalist on the *Beagle*. Darwin was eager to accept, but his father objected, in the terms set forth in MS. No. **3** here shown. The objections were submitted to Darwin's uncle, Josiah Wedgwood, whose reply is here shown (No. **2**). Lent by Francis Darwin, Esq., F.R.S.

2. A letter from Josiah Wedgwood (second son of the distinguished potter) to Darwin's father, which decided the latter to allow his son to go on the *Beagle* expedition. Dated August 31st, 1831. Lent by Francis Darwin, Esq., F.R.S.

3. A manuscript by Charles Darwin detailing his father's objections to his going on the *Beagle* voyage. Lent by Francis Darwin, Esq., F.R.S. This paper was submitted to Josiah Wedgwood, when his advice was solicited, and it is referred to in Wedgwood's reply here shown (No. **2**). The objections are as follows :—

"1. Disreputable to my character as a Clergyman hereafter.
"2. A wild scheme.
"3. That they must have offered to many others before me the place of Naturalist.
"4. And from its not being accepted there must be some serious objection to the vessel or expedition.

* See footnote, p. 4.

"5. That I should never settle down to a steady life hereafter.
"6. That my accommodations would be most uncomfortable.
"7. That you should consider it as again changing my profession.
"8. That it would be a useless undertaking."

4. Four pages of zoological notes on *Aplysia*, *Planaria*, and *Cleodora*, made by Darwin during the voyage of the *Beagle*. They are dated February, 1832. Lent by Francis Darwin, Esq., F.R.S.

5. A list of the officers and men of the *Beagle*, dated October, 1836, *i.e.*, on the completion of the voyage. Darwin's name occurs at the top of the left-hand column. Lent by Francis Darwin, Esq., F.R.S.

6. A letter from Darwin to Owen, dated Thursday 28th, 36, Gt. Marlboro' St., referring to the return of the proof-sheets of Owen's paper on *Toxodon*, which were submitted to Darwin for criticism. The date is probably 1837.

7. A letter from Darwin to George R. Gray, of the British Museum, thanking him for a copy of his book on the "Genera of Birds," and expressing a hope that he would now be free to complete the volume of the *Beagle* Birds left unfinished by John Gould. The date of the letter is probably 1840.

8. A letter from Darwin to Owen referring to a weathered Elephant's tooth and a tusk from Peru. Judging from the address (12, Upper Gower Street) the date of the letter is between 1839 and 1842.

9. A letter from Darwin to Daniel Sharp dealing with foliation, cleavage, stratification, volcanic rocks, and other geological matters. The letter bears the postmark November 2nd, 1846.

10. A hitherto unpublished letter bearing the post-mark August 2nd, 1843, written by Darwin to G. R. Waterhouse (afterwards of the British Museum), and expressing his views as to what should be aimed at in classifying animals and plants. He writes: "All rules for a natural classification are futile until you can clearly explain what you are aiming at. Until that is done I must protest against sameness of country (as with the Monotremata) being used. . . . I believe . . . that if every organism which ever had lived or does live were collected together (which is impossible, as only a few can have been preserved in a fossil state), a perfect series would be presented, linking all, say the Mammals, into one great, quite indivisible group." Lent by C. O. Waterhouse, Esq.

11. A letter from Darwin to Owen, saying that Captain Sulivan, R.N., had arrived in London with six casks of fossil bones from the southern part of Patagonia, and expressing a wish to examine the bones with Owen, when they had been unpacked at the Royal College of Surgeons Museum. Date probably between 1840 and 1850.

12. A letter from Darwin to Owen, dated "Nov. 25th, Down, Farnborough, Kent," asking for the loan of some Barnacles from the College of Surgeons Museum. Date between 1846 and 1851.

13. A hitherto unpublished letter, bearing the post-mark July 27th, 1843, written by Darwin to G. R. Waterhouse (afterwards of the British Museum). Darwin writes, in reference to a discussion on classification :—"It has long appeared to me that the root of the difficulty in settling such questions as yours—whether number of species, etc., etc., should enter as an element in settling the value or existence of a group—lies in our ignorance of what we are searching after in our natural classification. . . . According to my opinion . . . classification consists in grouping beings according to their . . . descent from common stocks. . . . There is one caution . . . the great doubt whether the groups which are now small may not have been at some former time abundant, and you will admit fossil and recent beings all come into one system. . . . Perhaps if the Goatsucker and Woodpecker were varied into very many genera, and very many species of each, they would be looked on as orders equal to the Hawks, etc." Lent by C. O. Waterhouse, Esq.

14. The first page of Darwin's 1844 sketch of his theory on the origin of species. The first clear conception of the theory occurred to Darwin at the end of 1838, or the beginning of 1839, but he did not set it out in writing till June, 1842. The 1842 draft consisted of 35 pages, and this was rewritten and expanded to 230 pages in the summer of 1844. The manuscript shown is the first page of the 1844 draft. Lent by Francis Darwin, Esq., F.R.S.

15. A letter from Darwin to Owen, asking for a specimen of *Balanus glacialis* from the College of Surgeons Museum. The left-hand half of the letter is a personal one to Owen, the right-hand half is a formal application which Owen might lay before the Council of the College if the sanction of that body were necessary. The date is probably 1852 or 1853.

16. A letter from Darwin to S. P. Woodward, of the British Museum, best known as the author of the "Manual of the Mollusca."

In this letter Darwin expresses his inability to accept the view (Carpenter's, 1844) that the Hippuritidæ are in any way a connecting link between the Oysters and the Barnacles. Date, May 6th, 1854. Lent by B. B. Woodward, Esq.

17. A letter from Darwin to S. P. Woodward, in which he discusses the relative antiquity of volcanoes, and expresses his disagreement with Von Buch's "elevation-crater-theory." The date is about 1860. Lent by B. B. Woodward, Esq.

18. A letter from Huxley to Darwin, dated November 23rd, 1859, in which he states that he has finished reading the "Origin of Species," and expresses the pleasure that the new views have given him. He advises Darwin not to be annoyed by the abuse which is doubtless in store for him, and assures him that he can rely upon the support of his friends. The letter is published in "Life and Letters of Charles Darwin," by F. Darwin, Vol. ii, pp. 231–2. Lent by Francis Darwin, Esq., F.R.S.

19. A letter from Darwin to Owen, dated December 13th, 1859, referring to the "Origin of Species," which had appeared during the preceding month. The letter is published in "The Life of Richard Owen," by R. Owen, 1894, Vol. ii, pp. 90–91.

20. A letter from Darwin to G. R. Waterhouse, of the British Museum, concerning "the eldest son of Sir J. Lubbock," the present Lord Avebury, whom he wished to propose for membership of the Entomological Society. Date, 1850.

21. A letter written by Darwin in 1854 or 1855 to William Harris, of Charing, Kent, from whom he had borrowed some Cirripedes to study when writing his monograph on that group of animals. Lent by C. D. Sherborn, Esq.

22. A long letter from Darwin to a correspondent whose name does not appear on the letter, and who was evidently opposed to the views expressed in the "Origin of Species." Darwin writes that as the undulatory theory of light is based on analogy with the passage of sound waves through air, so he defends his theory of natural selection by analogy with artificial selection. In the latter part of the letter he states that he did not discuss "alternation of generations," because he looked upon the non-sexual reproduction as a process of gemmation during a larval stage, and that the life-history as a whole does not differ essentially from one in which there is no alternation. The date of the letter is probably 1861.

23. A letter from Darwin to Owen, dated "Saturday evening,

Down, Farnborough, Kent," referring to negotiations for the purchase of a skeleton of the Sabre-toothed Tiger, *Machairodus*, offered by Señor F. Muniz, and to a translation into English of a Spanish paper on these remains.

24. A letter from Darwin to Samuel Butler thanking him for a copy of a work of his, probably either "Erewhon" (1872) or "The Fair Haven" (1873), both of which were published under the initials "S. B." Darwin states that he would not have suspected Butler as the author of the book. The date of the letter is probably 1872 or 1873.

MANUSCRIPTS (*continued*), BOOKS,* ETC.

In Case **3**, a large table-case standing on the Eastern side of the main staircase :—

25. An early note-book of Darwin's containing observations made when he was at Edinburgh in March 1827. On the right-hand page shown he describes his discovery of the young of the Skate-leech, *Pontobdella muricata*. Lent by Francis Darwin, Esq., F.R.S.

26. Darwin's pocket-book, containing notes made in September, 1834, while at Santiago, during the voyage of the *Beagle*. Most of the notes are geological, but some refer to the natural history of the country. Lent by Francis Darwin, Esq., F.R.S.

27. Darwin's pocket-book, containing notes on the geological structure of the Coquimbo valley made after the arrival of the *Beagle* at Valparaiso in July, 1834. The notes are in pencil throughout, and each page is scored across, presumably to denote that a copy had been made. Lent by Francis Darwin, Esq., F.R.S.

28. Letters written by Darwin during the voyage of the *Beagle* to Professor Henslow, who read them at a meeting of the Cambridge Philosophical Society in November, 1835, and had them printed for distribution among the members of the Society.

29. Twenty-four pages of notes of Insects caught during the voyage of the *Beagle*. The corrections and additions are in Darwin's handwriting. The capture of live beetles in the sea at a distance of seventeen miles from land, here recorded, is published in the "Naturalist's Voyage round the World," p. 159 of the 1882 edition.

* Only a selected series of Darwin's books and scientific papers is here shown; a complete list of his writings is to be found at the end of Vol. iii of the "Life and Letters of Charles Darwin," by F. Darwin, 1887. A large proportion of the books in Case **3** are books on Darwinism, and other writings inspired by Darwin's work.

30. Microscope used by Darwin on the *Beagle*. Lent by Sir George H. Darwin, K.C.B., F.R.S.

31. Microscope used by Darwin. Lent by Sir George H. Darwin, K.C.B., F.R.S.

32. Simple microscope used by Darwin on the *Beagle*. Lent by Sir George H. Darwin, K.C.B., F.R.S.

33. (At the top of the case). Dissecting microscope used by Darwin. Lent by Francis Darwin, Esq., F.R.S.

34. A volume of notes on Reptiles, etc., made on the *Beagle* expedition, those on the left-hand page shown being in Darwin's handwriting. Date, September, 1835; locality, Galapagos Islands. The first note on the page has reference to the Sea Iguana, *Amblyrhynchus cristatus*, a lizard of which Darwin gives a figure in the "Naturalist's Voyage round the World," p. 385. (A stuffed specimen of the lizard is shown in Case **12.**) Of further interest is the pencil note on the right-hand page allotting specimen 1315 another *Amblyrhynchus*, for dissection by Mr. Owen.

35. Darwin's "Naturalist's Voyage round the World" or "Journal of Researches into the Natural History and Geology of the Countries visited during the Voyage of H.M.S. *Beagle* round the World, under the command of Captain Fitzroy, R.N.," 1882. (The original appeared in 1839 in Vol. iii of the "Narrative of the Surveying Voyages of H.M.S *Adventure* and *Beagle*." It was issued separately as "Journal of Researches, etc.," and a second edition appeared in 1845, and was re-issued in 1860 with a postscript.) The book is opened at pp. 384–5, showing a figure of the Sea Iguana, *Amblyrhynchus cristatus*, mentioned in the MS. above.

36. "Zoology of the Voyage of H.M.S. *Beagle*," edited and superintended by Charles Darwin:

Part I. Fossil Mammalia, by Richard Owen, 1840.
Part II. Mammalia, by G. R. Waterhouse, 1839.
Part III. Birds, by John Gould (and G. R. Gray), 1841.
Part IV. Fish, by the Rev. Leonard Jenyns, 1842.
Part V. Reptiles, by Thomas Bell, 1843.

37. Darwin's "Structure and Distribution of Coral Reefs"; being Part I of the Geology of the Voyage of the *Beagle*. London, 1842. (Republished with Parts II and III in 1851; Second Edition, 1874; Third Edition, 1889.)

38. Darwin's "Geological Observations on the Volcanic Islands

visited during the Voyage of H.M.S. *Beagle*"; being Part II of the Geology of the Voyage of the *Beagle*. London, 1844. (Republished with Parts I and III in 1851; Second Edition, with Part III, 1876.)

39. Darwin's "Geological Observations on South America"; being Part III of the Geology of the Voyage of the *Beagle*. London, 1846. (Republished with Parts I and II in 1851. Second Edition, with Part II, in 1876.) The three fossils figured in the left top corner of the plate shown are exhibited in Case **6**.

40. Several pages in Darwin's handwriting of an abstract of Pallas's "Mémoire sur la variation des animaux" (Acta Acad. Sci. Imp. Petropol., 1780). It is interesting as showing the kind of abstracts Darwin made of the books that he read. Lent by Francis Darwin, Esq., F.R.S.

41. Pallas's paper, "Mémoire sur la variation des animaux" (Acta Acad. Sci. Imp. Petropol., 1780), opened at pages 84 and 85 for comparison with the notes made by Darwin and shown in the manuscript above.

42. A note-book of Darwin's, dealing chiefly with expression. It bears the date 1838, and the address 36, Great Marlborough Street, and contains numerous references to information supplied by his father in the course of conversation. Lent by Francis Darwin, Esq., F.R.S.

43. A copy of questions on cross-breeding drawn up by Darwin for circulation among farmers and cattle-breeders. The questions are twenty-one in number, and are printed with a wide margin for replies. The copy is not dated, but since it is addressed from 12, Upper Gower Street, the date of issue is probably about 1840.

44. Darwin's "Monograph of the Sub-class Cirripedia, with Figures of all the Species." The Lepadidæ, or Pedunculated Cirripedes. London, 1851. (Ray Society.)

45. Darwin's "Monograph of the Sub-class Cirripedia, with Figures of all the Species." The Balanidæ, or Sessile Cirripedes, the Verrucidæ, etc. London, 1854. (Ray Society.)

46. Darwin's "Monograph of the Fossil Lepadidæ, or, Pedunculated Cirripedes of Great Britain." London, 1851. (Palæontographical Society.) "A Monograph of the Fossil Balanidæ and Verrucidæ of Great Britain." London, 1854. (Palæontographical Society.)

47. A letter from Darwin to Owen, dated July 17th, 1854, in reply to a letter from Owen complimenting him on his monograph on the Cirripedia. The letter is published in "The Life of Richard Owen," by R. Owen, 1894, Vol. i, pp. 407–8.

48. "The Life of Richard Owen," by R. Owen, Vol. i, p. 408, showing the letter from Darwin to Owen, of which the original is shown above.

49. Two selected pages of Darwin's copy of his letter to Prof. Asa Gray, dated September 5th, 1857, a letter which constituted part of the paper "On the Tendency of Species to form Varieties, and on the Perpetuation of Varieties and Species by Natural Means of Selection," which was communicated to the Linnean Society by Darwin and Wallace jointly on July 1st, 1858. The letter was published in the Journal of the Linnean Society, Zoology, Vol. iii, No. 9, 1858 [1859], pp. 50–53 (see copy here shown), and was republished in "The Darwin-Wallace Celebration" volume of the Linnean Society, 1908, pp. 95–98.

50. Journal of the Linnean Society, Zoology, Vol. iii, London, 1859. The copy is opened at pp. 50 and 51, showing the letter from Darwin to Asa Gray, of which the original MS. is here exhibited.

51. "The Foundations of the Origin of Species," being Darwin's 1842 preliminary sketch of the Origin of Species, edited by Francis Darwin, F.R.S., and printed by the Cambridge University Press, 1909. Copies of this book were presented by the Syndics of the University Press to the delegates and other guests at the Cambridge Darwin Commemoration, June 23rd, 1909.

52. Darwin's "On the Origin of Species by means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life," London, 1859. (Second Edition, 1860; Third, 1861; Fourth, 1866; Fifth, 1869; Sixth, 1872.) The copy shown is of the first edition. Lent by J. C. Simpson, Esq.

53. A paper by Dr. W. C. Wells, entitled, "An Account of a Female of the White Race of Mankind, part of whose Skin resembles that of a Negro," a paper in which he recognises the principle of natural selection in the case of the different races of man, and compares it with the improvement of the varieties of domestic animals by selective breeding. The paper was read before the Royal Society in 1813, but was not published by that body; it appeared as part of Dr. Wells's book on "Single Vision, Dew, Letter to Lord

Kenyon, etc.," in 1818 (the book here shown). The paper was apparently unknown to Darwin at the time that he wrote the " Origin of Species." In the " Historical Sketch " at the beginning of the sixth edition of that work he gives a lengthy quotation from it, including the passage here marked.

54. Note B of the Appendix of Patrick Matthew's book on " Naval Timber and Arboriculture," 1831, in which a reference to Nature's method of elimination of the least fit is expressed in the words—" those individuals who possess not the requisite strength, swiftness, hardihood, or cunning falling prematurely without reproducing . . . their place being occupied by the more perfect of their own kind . . ." (p. 365). A similar statement occurs on p. 384, in a section of the Appendix devoted to the adaptation of living things to their environment.

Although Matthew's book was published in 1831, Darwin did not see it till April, 1860, after the appearance of the second edition of the " Origin of Species," when Matthew republished his views in the *Gardener's Chronicle*. Darwin at once wrote to the *Gardener's Chronicle* a letter, in which occur the words, " I freely acknowledge that Mr. Matthew has anticipated by many years the explanation which I have offered of the origin of species, under the name of natural selection."

55. A copy of the first edition of the " Vestiges of the Natural History of Creation," published anonymously in 1844, and attributed to various writers, but subsequently known to be the work of Robert Chambers. The author writes (p. 222) : " The idea which I form of the progress of organic life upon the globe . . . is that the simplest and most primitive type, under a law to which that of like-production is subordinate, gave birth to the type next above it, that this again produced the next higher, and so on to the very highest, the stages of advance being in all cases very small—namely, from one species only to another; so that the phenomenon has always been of a simple and modest character." Since the book appeared after Darwin had rewritten and expanded the first draft of his views upon the origin of species, it cannot have influenced him much, but Darwin frankly admits, nevertheless, in the " Historical Sketch " in the sixth edition of the " Origin of Species," that the writer of the book " argues with much force on general grounds that species are not immutable productions."

56. A letter written by Darwin to Owen, giving the reference to the page in Hearne's " Travels " in which mention is made of

North American bears swimming in water and swallowing water-insects. Owen criticised Darwin for suggesting that this habit of the bear might in course of time lead to the evolution of a purely aquatic animal "like a whale" (see p. 25 of Owen's *Edinburgh Review* article here shown).

The letter also refers to a copy of Hunter's "Essays and Observations" which he was expecting to receive from Owen. The printed slip giving the address to which Darwin wished the book sent is interesting as showing the methodical habits of the writer.

Judging from the date of Owen's criticism and the date of the publication of Hunter's book, the letter was written in 1860.

57. Proof-sheets of the hostile "Edinburgh Review" article on the "Origin of Species," April 1860, found among the papers of Sir Richard Owen after his death. The article was not signed, but it was generally known to have been written by Owen.

58. Darwin's "On the Various Contrivances by which British and Foreign Orchids are fertilised by Insects, and on the Good Effect of Intercrossing," London, 1862. (Second Edition, 1877.) Lent by Dr. F. Du Cane Godman, F.R.S.

59. "Für Darwin," by Fritz Müller, Leipzig, 1864. (A translation by W. S. Dallas was published in London, 1869, entitled "Facts and Arguments for Darwin."). The book deals mainly with Crustacea, and comprises a number of facts which support Darwin's theory of natural selection.

60. "The Darwinian Theory of the Transmutation of Species," examined by a Graduate of the University of Cambridge, London, 1867.

61. Darwin's "Variation of Animals and Plants under Domestication," 2 Vols., London, 1868. (Second Edition, 1875.)

62. "Natürliche Schöpfungsgeschichte," by Ernst Haeckel, Berlin, 1868. (A translation by Miss L. D. Schmitz was published in London in 1875 under the title, "The History of Creation.")

63. "Note alla Teoria Darwiniana," by Achille Quadri, Bologna, 1869.

64. Darwin's "Descent of Man, and Selection in Relation to Sex," 2 Vols., London, 1871. (Second Edition, in one volume, 1874.)

65. "Charles Darwin et ses précurseurs français," Étude sur le Transformisme, by A. de Quatrefages, Paris, 1870.

66. "Studien zur Descendenz-Theorie," by August Weismann, Leipzig, 1875–6. (A translation by R. Meldola was published in London in 1882 under the title "Studies in the Theory of Descent.")

67. A page of Darwin's manuscript of the "Expression of the Emotions," Chapter vi. It has reference to the shedding of tears and it shows the considerable amount of alteration to which the author subjected his original draft before he was satisfied with it. The date is probably about 1871. The copy of the "Expression of the Emotions" which is shown by the side of the manuscript is opened at the page where the particular passage occurs. Lent by Francis Darwin, Esq., F.R.S.

68. Darwin's "Expression of the Emotions in Man and Animals." London, 1872. (Second Edition, 1873.) The copy is opened at pp. 168–169, and the passage of which Darwin's manuscript is shown is marked in the margin.

69. A copy of the First Edition of the "Expression of the Emotions in Man and Animals," 1872, open to show Plate 1, with six figures of crying children. Lent by Dr. F. Du Cane Godman, F.R.S.

70. "Le Darwinisme," by Emile Ferrière, Paris, 1872.

71. "Der Darwinismus und die Naturforschung Newtons und Cuviers," by Albert Wigand, Brunswick, 1874–1877.

72. Darwin's "Movements and Habits of Climbing Plants." London, 1875. (Second Edition, 1876; originally published in the Journal of the Linnean Society, Botany, ix, 1865.)

73. Darwin's "Effects of Cross and Self Fertilisation in the Vegetable Kingdom," London, 1876. (Second Edition, 1878.)

74. Darwin's "Insectivorous Plants." London, 1875. (Second Edition, 1875.)

75. Darwin's "Different Forms of Flowers on Plants of the same Species," London, 1877. (Second Edition, 1880.)

76. "The Power of Movement in Plants," by Charles Darwin, assisted by Francis Darwin, London, 1880.

77. Darwin's "Formation of Vegetable Mould through the Action of Worms, with Observations on their Habits," London, 1881. (Second Edition, 1883.) Lent by J. C. Simpson, Esq.

78. "The Life and Letters of Charles Darwin," including an Autobiographical Chapter, by Francis Darwin, 3 Vols., London, 1887.

79. "Darwinism," an Exposition of the Theory of Natural Selection with some of its Applications, by Alfred Russel Wallace, London, 1889.

80. "From the Greeks to Darwin," by H. F. Osborn, New York, 1894 (Columbia University Series). Presented by Messrs. Macmillan & Co.

81. "Darwin and after Darwin," an Exposition of the Darwinian Theory and a Discussion of post-Darwinian Questions, by G. J. Romanes, 3 Vols., London, 1892, 1895 and 1897.

82. "More Letters of Charles Darwin," by F. Darwin and A. C. Seward, 2 Vols., London, 1903. Lent by Mr. John Murray.

83. "Essays on Evolution, 1889–1907," by E. B. Poulton, 1908. Lent by the Oxford University Press.

84. "The Darwin-Wallace Celebration," an account of the celebration held by the Linnean Society of London on July 1st, 1908, this being the fiftieth anniversary of the reading of the joint paper by Darwin and Wallace on July 1st, 1858. The joint paper is republished in this volume, and the speeches made by the seven medallists are recorded. Lent by Dr. S. F. Harmer, F.R.S.

85. "Catalogue of the Library of Charles Darwin, now in the Botany School, Cambridge," compiled by H. W. Rutherford, 1908.

86. "Darwin and Modern Science"; twenty-nine essays in commemoration of the centenary of the birth of Charles Darwin and of the fiftieth anniversary of the publication of the "Origin of Species"; edited by Prof. A. C. Seward, M.A., F.R.S.; Cambridge University Press, 1909.

87. Order of the Proceedings at the Darwin Celebration held at Cambridge, June 22–24, 1909; with a sketch of Darwin's life, and eleven plates. Presented by the Syndics of the University Press, Cambridge.

88. "Christ's College Magazine," Vol. xxiii, No. 70, Cambridge, 1909. Darwin Centenary Number. The book is opened at pp. 222–3, and shows a letter from Darwin to Wallace, April 6th, 1859, after the reading of their joint paper before the Linnean Society and before the publication of the "Origin of Species."

List of Exhibits; Case 4. 19

PORTRAITS, SKETCHES, MEDALS, ETC.

In Case **4**, an upright case at the entrance to Bay VI, the bay or recess opposite Case **3** :—

89. Water-colour sketch of the *Beagle* in Tierra del Fuego, drawn by —. Martens, artist on the *Beagle* expedition. Lent by Sir George H. Darwin, K.C.B., F.R.S.

90. Coloured print of Christ's College from the street, about Darwin's time. From R. Ackermann's "History of Cambridge," 1815; drawn by W. Westall, and engraved by Black. Lent by A. E. Shipley, Esq., F.R.S.

91. Coloured print of the Botanic Gardens, Cambridge, about Darwin's time. From R. Ackermann's "History of Cambridge," 1815; drawn by W. Westall, and engraved by J. Stadler. Lent by A. E. Shipley, Esq., F.R.S. The Botanic Garden here shown is the old Botanic Garden of the University, on the site of which most of the Museums and Laboratories were built later. The picture shows, in the middle, King's College Chapel (mentioned by Darwin as one of the things that gave him most pleasure in Cambridge), the tower of St. Bene't's Church (on the left), and that of Great St. Mary's, the University Church (on the right).

92. Portraits of seven generations of Darwins. Charles Darwin is the third of the series. To the left are his son George and grandson Charles; and to the right his father Robert Darwin, doctor of medicine, his grandfather Erasmus Darwin, author of "Loves of the Plants," Robert, the father of Erasmus, and William, the grandfather. Lent by Sir George H. Darwin, K.C.B., F.R.S.

93. Portrait of Darwin as a boy of seven, with his sister; reproduced from a small pastel drawing made in 1816 by Sharples, now in the possession of Miss Wedgwood of Leith Hill Place. Lent by Horace Darwin, Esq., F.R.S.

94. Portrait of Darwin's father, Robert Waring Darwin, M.D., F.R.S., born 1766, died 1846; mezzotint by Thomas Lupton, after the painting by James Pardon, Shrewsbury; published 1839.

95. A reproduction by Mr. Dew-Smith of a photograph of Darwin by Messrs. Maull and Fox, taken about 1854. The copy shown is from the "Annals of Botany," xiii, 1899; similar reproductions have appeared in "More Letters of Charles Darwin," 1903, and "Darwin and Modern Science," edited by A. C. Seward, 1909. A wood engraving of the photograph was published in *Harper's*

Mayazine, October, 1884, and in "Life and Letters of Charles Darwin," Vol. i, 1887.

96. An early portrait of Darwin after T. H. Maguire. (Ipswich British Association Series, 1849.) The copy shown is from the *Bookman*, Feb. 1909.

97. Two Replicas of the Linnean Society's Darwin-Wallace Medal struck in 1908 to commemorate the fiftieth anniversary of the reading of the joint paper by Darwin and Wallace, at the Society's meeting on July 1st, 1858. The medal was designed by Frank Bowcher, Esq. Seven of the medals were awarded in 1908, the first recipient being A. R. Wallace. Lent by C. E. Fagan, Esq., and B. B. Woodward, Esq.

98. Electrotype of the original wax model from which the Darwin Medal of the Royal Society is reduced. Presented to the Museum by the late Sir John Evans, P.S.A., Treas. Roy. Soc., Feb. 28th, 1891. The Darwin Medal was first awarded in 1890, and the first medallist was A. R. Wallace. The medal was executed by Allan Wyon, Esq.

99. Darwin's study at Down, shortly after his death; etching by A. H. Haig, 1882. Lent by Horace Darwin, Esq., F.R.S.

100. Darwin's study at Down, Kent; photograph by W. England. Lent by Francis Darwin, Esq., F.R.S.

101. Photograph of the statue of Darwin by Sir J. E. Boehm, R.A. The statue is situated on the main staircase of the Museum, and the photograph is reproduced opposite page 7 of this Guide. Photograph by Mr. H. G. Herring.

102. Photograph of Darwin taken by Mrs. Cameron about 1868. Lent by Francis Darwin, Esq., F.R.S. This is reproduced, by kind permission of Mr. John Murray, as the frontispiece of this Guide.

103. Photograph of Darwin, about 1874, taken by Major Leonard Darwin, R.E., Pres. R.G.S. Lent by Horace Darwin, Esq., F.R.S. This portrait was engraved on wood for the *Century Magazine*, January, 1883, and is reproduced in "Life and Letters of Charles Darwin," Vol. ii, 1887.

104. Wood engraving by G. Kruell, 1889, of a photograph of Darwin by Messrs. Elliott and Fry, 1882. Lent by the Linnean Society of London.

105. Photograph of Darwin, enlarged from a negative taken by O. J. Rejlander about 1870.

106. A steel engraving by C. H. Jeens of a photograph of

Darwin by O. J. Rejlander in 1870 (?); published in *Nature*, June 4th, 1874. Presented by Messrs. Macmillan & Co.

107. Three photographs of Darwin by the London Stereoscopic Company, taken about 1864.

108. Four photographs of Darwin by Messrs. Elliott and Fry, taken in 1882, *i.e.* the year of his death.

109. Photograph of the oil painting of Darwin by W. W. Ouless, R.A., 1875, in the possession of W. E. Darwin, Esq.

110. A half-tone reproduction of P. Rajon's etching of the oil painting of Darwin by W. W. Ouless, R.A., 1875, in the possession of W. E. Darwin, Esq. The copy shown is from the *Bookman*, Feb. 1909.

111. Photograph of the oil painting of Darwin by the Hon. John Collier, R.A., 1881, in the possession of the Linnean Society of London. Lent by the Linnean Society.

112. Photograph of Darwin taken by his son, Major Leonard Darwin, between 1872 and 1878. Lent by Major Leonard Darwin, R.E., Pres. R.G.S.

113. Photograph by W. W. Naunton of the statue of Darwin by H. Montford, situated in front of the Old Shrewsbury School (now a Museum and Library).

114. Photograph of the village of Down, enlarged from a negative by G. W. Smith, Esq. Lent by Horace Darwin, Esq., F.R.S.

115. Photograph of Darwin's House at Down. Lent by Horace Darwin, Esq., F.R.S.

FOSSIL BONES COLLECTED BY DARWIN.

In Case **11**, an upright table-case standing across the Entrance of Bay VIII (the third bay or recess on the Eastern side of the Hall counting from the Huxley statue):—

Fossil bones collected by Darwin in the latter part of the year 1833 and the beginning of 1834, during the voyage of the *Beagle*. They are from the Pampas Formation (Pleistocene) of the Argentine Republic, and the Pleistocene of Patagonia. Darwin presented the bones to the Royal College of Surgeons Museum on his return, and descriptions of them were published by Owen. They are now exhibited here by the courtesy of the Council of the Royal College of Surgeons.

Notable among these remains are two teeth of an extinct Horse,

Equus curvidens, the first fossil teeth of a horse-like animal discovered in the New World ; bones and teeth of Great Ground Sloths of the genera *Megatherium*, *Mylodon*, and *Scelidotherium ;* bones of *Macrauchenia ;* and skull of *Toxodon*, a large extinct Ungulate, of the sub-order Toxodontia. Darwin records how he found this particular skull lying in the yard of a farmhouse near the Sarandis, a tributary of the Rio Negro, where the boys had amused themselves by throwing stones at it, and pulling out the teeth. He purchased it, the first discovered relic of the new sub-order, for eighteenpence. A letter from Darwin to Owen concerning this skull is exhibited in Case **1** (No. **6**).

BARNACLES AND CORALS STUDIED BY DARWIN.

In Case **13**, a table-case standing in Bay IX (the second bay or recess on the Eastern side of the Hall counting from the Huxley statue) :—

Specimens of Cirripedia or Barnacles in illustration of Darwin's work on that group. Darwin's Monograph on the Cirripedia, published in 1851–1854, is still one of the chief works of reference on this group of animals. The work was largely based on an examination of the Museum collection, which therefore contains the type-specimens or co-types of most of the new species described by Darwin. The specimens exhibited comprise :—

A. Common types of Cirripedia, stalked Barnacles, sessile Barnacles, etc.

B. Specimens and drawings illustrating special discoveries made by Darwin :—*Proteolepas*, a maggot-like Barnacle, of which only one specimen has been discovered, *Cryptophialus*, another extremely peculiar form, and the complemental males of *Scalpellum*. The great majority of Cirripedes are hermaphrodite, having both sexes combined in each individual. Darwin discovered, however, that certain species have minute males, which are attached like parasites to the hermaphrodite individuals, and to these he gave the name of "complemental males." In a few species the separation of the sexes is complete, and the large individuals are purely female.

C. Specimens described or mentioned in Darwin's work, with some notes in his handwriting. Particular attention is called to the series of *Balanus amphitrite*, a series selected by Darwin himself, with a manuscript of his in which he expresses the difficulty which he experienced in defining the limits of the species.

On the other side of the case are shown specimens of Corals,

Millepores and Nullipores collected by Darwin in 1836 on Keeling Island, an atoll in the Indian Ocean, 800 miles S.W. of Batavia. The series shows corals in the fresh state and in various stages of conglomeration to form the body of the atoll; also some water-worn coral pebbles. The explanatory account of the specimens is in Darwin's own handwriting: the writing being in places difficult to decipher, a printed copy of it is also shown. Darwin's observations on coral reefs were published in 1842 as the "First Part of the Geology of the Voyage of the *Beagle*—The Structure and Distribution of Coral Reefs"; and a second edition was published in 1874.

OTHER SPECIMENS COLLECTED BY DARWIN, OR STUDIED BY HIM, OR OTHERWISE CLOSELY CONNECTED WITH HIS WORK.

In Case **6**, the North wall-case in Bay VII, the third recess on the Eastern side of the Hall counting from the Huxley statue, are shown a few of the specimens, other than Corals and Fossil Mammals, collected by Darwin when on the voyage of the *Beagle*.

(The greater part of the collection of natural history specimens was deposited with the Zoological Society, and a selection of the Birds and Mammals was transferred to the British Museum in 1855. The Fishes were sent to Cambridge, and are now in the University Museum of Zoology. The fossil bones were sent to the Royal College of Surgeons Museum, and are shown here in Case **11**, on loan from the College. The fossil Mammal bones were described by R. Owen in Part 1 of the "Zoology of the Voyage of H.M.S. *Beagle*," the recent Mammals by G. R. Waterhouse in Part 2, the Birds by J. Gould (and G. R. Gray) in Part 3, the Fishes by L. Jenyns in Part 4, and the Reptiles by T. Bell in Part 5. The Insects were not described in the *Beagle* reports, but an account of the new species was written by G. R. Waterhouse, and published by the Zoological Society.)

116. A selection of *Beagle* Insects.

117. A small selection of *Beagle* Reptiles and Amphibians. The specimens shown are two species of Lizard, a small Snake, and three tailless Batrachians. Of these last the form known as *Rhinoderma darwinii*, first known to science through Darwin's capture of it, is of particular interest from the exceptionally large size of the gular pouches of the male, a pair of pouches in the floor of the mouth which in this species extend far back beneath the skin of the belly,

and within which the eggs undergo their development, the young frogs emerging from the mouth of the parent on the completion of the metamorphosis.

118. A small selection of *Beagle* Birds, namely three Mocking Birds (*Mimus*).

119. A small selection of *Beagle* Mammals, namely three Opossums and two Murid Rodents.

120. The skin of the Fox which Darwin killed with a geological hammer in the island of San Pedro, South Chili, in 1834. This is the fox of which Darwin writes: "two of the officers landed to take a round of angles with the theodolite. A fox (*Canis fulvipes*) . . . was sitting on the rocks. He was so intently absorbed in watching the work of the officers that I was able, by quietly walking up behind, to knock him on the head with my geological hammer." ("Naturalist's Voyage round the World," Ed. 2, p. 280.)

121. Darwin's geological hammer, probably the one with which he killed the fox, here shown. Lent by W. E. Darwin, Esq.

122. (In the upper part of the case.) Darwin's insect net, with scissor handles. Lent by Sir George H. Darwin, K.C.B., F.R.S.

123. Three fossil Cephalopods described and figured in Darwin's "Geological Observations on South America," 1846, plate 5. *Nautilus d'orbignyanus* and *Baculites vagina* were obtained from the Upper Cretaceous of Chili, and *Ancyloceras simplex* from the Cretaceous of Tierra del Fuego. These specimens were transferred from the Museum of Practical Geology in 1880.

124. (In the upper left-hand corner of the case.) The skull of the Niatu Ox sent to Darwin by Captain Sulivan after the return of the *Beagle*. Lent by the Royal College of Surgeons. The Niatu Cattle of South America show what a great difference in the chances of survival or extinction may be made by a small difference in structure. These cattle, owing to the shortness of the muzzle and the consequent projection of the lower jaw, cannot browse on the twigs and reeds to which other cattle are driven in times of drought, and they perish if not fed by their owners. ("Origin of Species," Chap. vii; "Naturalist's Voyage round the World," Chap. viii, Ed. 2, p. 145.) Another skull (**125**), with the front teeth complete, is shown on the floor of the case.

126. (On the floor of the case.) A Porto Santo Rabbit, a breed of rabbit which in Darwin's opinion had by isolation evolved charac-

ters which distinguished it from the original domestic stock ("Animals and Plants under Domestication," Chap. iv). In 1418 a rabbit on a vessel travelling from Spain to Porto Santo, near Madeira, gave birth to young, which were subsequently turned loose on the island, where, in course of time, they multiplied to such an extent as to become a pest. In 1861 two of the Porto Santo rabbits were brought alive to the Zoological Gardens, and it was noticed that these feral rabbits were, on comparison with English wild rabbits, smaller, more wild, shy and active, more nocturnal, and that they did not exhibit the usual blackish grey fur on the upper surface of the tail and the tips of the ears. Since, further, they refused to mate with English rabbits, it was urged that by isolation the feral rabbits had evolved characters not possessed by the original stock. It is now known, however, that the common rabbit of the countries round the Mediterranean is not the same as the English rabbit, and an error in the argument was introduced by instituting a comparison between the Porto Santo rabbit and the English rabbit, instead of the Spanish rabbit.

127. (On the floor of the case.) A small selection of the Ducks studied by Darwin in the course of his work on Domesticated Animals, and presented by him to the Museum. For Darwin's views on Domestic Ducks see "Animals and Plants under Domestication," Vol. i, pp. 290–302.

128. (On the floor of the case.) A small selection of the Pigeons studied by Darwin in the course of his work on Domesticated Animals. See "Animals and Plants under Domestication," Vol. i, pp. 137–235. The birds here shown represent one-third of the Pigeons presented to the Museum by Darwin in 1867. (A carefully mounted Blue Rock Pigeon and most of the common breeds of Domestic Pigeon are shown in Case **18** in the body of the Hall.)

SPECIMENS ILLUSTRATING DARWIN'S DISCOVERIES, OR ILLUSTRATING PASSAGES IN HIS PUBLISHED WRITINGS, MORE PARTICULARLY THE "ORIGIN OF SPECIES."

(The sequence of the specimens is on the whole based on that of the chapters in the "Origin of Species," but owing to various considerations the rule has not been strictly followed. The sixth edition of the "Origin of Species" was used in the arrangement of

the series, and the references to the chapters given in the labels attached to the specimens refer to that edition. The sixth edition, 1872, is the last edition; copies bearing more recent dates are reprints, differing in pagination, but in no essential respect.)

129. (At the left-hand end of Case **6.**) A skin of a Peacock Pheasant, *Polyplectron malaccense*, in which Darwin found the clue to the evolution of the single notched "eye" of the Peacock's tail feather from the paired ocellus such as is found in the tail feathers of *Polyplectron chinquis* (also shown). In the frame marked Case **5**, near this specimen, are shown Peacock feathers selected and arranged so as to form a graded series, gradation in characters being, as Darwin pointed out, important evidence in arriving at an explanation of the origin of highly complex structures. In connection with these feathers should be studied those of the wings of the Argus Pheasant in Case **10**, on the opposite side of the Bay, showing the rows of "eyes" resembling balls in sockets. At the right-hand end of Case **9** is a photograph (**204**, lent by the University Museum of Zoology, Cambridge) of the fire-screen made from the feathers of the Argus Pheasant referred to by Darwin in his observations on the evolution of ocelli ("Descent of Man," Ed. 2, p. 441).

130. (In the left half of Case **6.**) An Indian Jungle Fowl, *Gallus bankiva*, reputed to be the wild ancestral form of the domestic breeds of Fowl. ("Origin of Species," Chap. i.; "Animals and Plants under Domestication," Chap. vii.) Examples of the principal breeds of Domestic Fowl are shown in Case **21.**

131. Blue Rock Pigeon, *Columba livia*, reputed to be the wild ancestral form of all domestic breeds of Pigeon. ("Origin of Species," Chap. i; "Animals and Plants under Domestication," Chaps. v and vi.) Examples of the principal breeds of Domestic Pigeon are shown in Case **18.** Attention may here be called to the large series of Domestic Animals of all kinds exhibited in the North Hall.

132. Red Grouse of Britain and Willow Grouse of Norway, cited by Darwin as a case in which difference of opinion existed whether the two birds were of distinct species or were local races of one and the same species. ("Origin of Species," Chap. ii, Doubtful Species.) In connection with the question here raised may conveniently be studied the series of Crows in Case **17.** Whether the intermediate forms there exhibited are regarded as having arisen by the interbreeding of two distinct species, or whether the two "species" of Crows are looked upon as dimorphic forms of a single

species, the series is interesting as illustrating the difficulty in defining the limits of a species. The Goldfinches also shown in Case **17** illustrate the same difficulty.

133. A series of thirty-three species of Fresh-water Mussel, *Unio*, from North America. An example of a large or dominant genus which includes a number of very distinct species. ("Origin of Species," Chap. xiv.) The species of the larger genera in each country vary more frequently than the species of the smaller genera. ("Origin of Species," Chap. ii.)

134 (In the upper part of the case.) A series of shells of *Vivipara* (= *Paludina*) of the Pliocene of Slavonia, arranged to show the evolution of ornamented and tuberculated forms in the higher strata from the smooth forms of the lower strata, in accordance with the views of Neumayr and Paul, 1875.

135. A series of shells of a Snail, *Helix picta*, in which the colours and markings of the shell exhibit a wide range of variation within the limits of the species.

136. A series of shells of *Neritina communis*. The colours and markings of the shell exhibit a wide range of variation within the limits of the species, and, as illustrated by the specimens in the bottom row, the same shell may show differences of pattern and colour in its earlier and later parts.

137. A series of shells of *Planorbis multiformis* from the Miocene of Steinheim, showing within the range of the same species a transition from the usual depressed form of shell to the turret form. Similar transitions are known in living species of *Planorbis*. The gradation of the forms of *Planorbis multiformis* in relation with different horizons is referred to in the "Origin of Species," Chap. x.

138. A series of thirty-three shells of *Paludomus* (*Tanalia*) *aculeatus*, Gmelin, from the streams of Ceylon, showing the great variation in size, form, sculpturing, and colouring observable within the limits of the species. Some of the varieties were formerly held to be distinct species, and the names given to the more marked of these have been placed under the examples shown.

139. A series of shells from the Baltic Sea and the North Sea. The Baltic specimens are shown above the corresponding specimens from the North Sea. Darwin suggests that possibly the dwarfing of the shells, admittedly due to the physical conditions of life, might be inherited for at least a few generations, in which case the Baltic

specimens would be called a " variety " of the usual form, such as is found in the North Sea. (" Origin of Species," Chap. ii, Variability.) Presented by the Riksmuseum, Stockholm.

140. Specimens of the Isopod Crustacean *Tanais* or *Leptochelia dubia.* As one of the perplexing differences occurring between individuals of the same species Darwin refers to the statement by Fritz Müller that in *Tanais* there are two forms of males, one with large pincer-claws, and the other with small claws, but with the antennae more abundantly furnished with smelling hairs than in the first kind. (" Origin of Species," Chap. ii.) According to Müller, whose specimens were collected on the coast of Brazil, the two forms of males are not connected by intermediate gradations. Recent investigations on specimens collected at Naples show that intermediate forms do occur between the " high form " *A*, and the " low form " *B*.

141–147. (In the upper part of Case **9**.) Seven series of Butterflies selected to illustrate the passages in A. R. Wallace's paper on the Papilionidæ of the Malayan Region (Trans. Linn. Soc., xxv, 1866) referred to by Darwin in Chap. ii of the later editions of the " Origin of Species."

141. Some representative or characteristic species of Butterflies from the Malayan region, belonging to families other than the Papilionidæ.

142. Specimens of *Papilio fuscus* (*P. severus* of Wallace) showing " simple variability." The species occurs in all the islands of the Moluccas and New Guinea, and exhibits in each of them a greater amount of individual difference than often serves to distinguish one species from another.

143. Specimens of *Troides priamus* illustrating " simple variability." In the left upper corner are a male and female from Amboyna, in which island both males and females are constant. Below are one male and two different females from New Ireland, whence a green form of male (not shown here) is also recorded. On the right are two different males and two different females from New Guinea.

144. Polymorphic females in Papilionidæ. In the first column are shown a male and four forms of female of *Papilio polytes*, all from the same locality in Ceylon. The second column shows a male and a " *theseus* " form of female from Sumatra, and below these a male, a " *theseus* " form of female, an intermediate female, and a " *ledebourius* " form of female, all from the Philippine Islands. In

the third column are a male of *Papilio ægeus* and three distinct forms of female (not from the same locality). In the fourth column are examples of seasonal dimorphism in *Araschnia levana*, in which species the second brood differs markedly from the first brood, and intermediate forms occur.

145. Polymorphic Females in Papilionidæ (continued). In the first column are shown a male and two different females of *Papilio memnon* from India; in the second a male and three different females from Java; and in the third column a male and two different females from Borneo.

146. Series of *Papilio agamemnon* illustrating the local races or sub-species occurring in the different islands of the Malay Archipelago. The races are distinguished by differences in size and outline; the differences are tolerably constant in each locality.

147. Series of *Papilio ulysses* illustrating the local races or sub-species occurring in the different islands of the Malay Archipelago. The races are distinguished by differences in the colour-markings, the outline of the wings, and the size of the patches of velvety scales on the fore wings of the males; the differences are constant, each local race being fixed and isolated.

148. (In the upper part of Case **6**.) Examples of male and female of the Cock-of-the-Rock, *Rupicola crocea*, a Parrot, *Eclectus cornelia*, the Ruff, *Pavoncella pugnax*, and a Bird of Paradise, *Cicinnurus regius*, showing the differences in the appearance of the two sexes. ("Origin of Species," Chap. iv, Sexual Selection; "Descent of Man," Chap. xiii.) For the aspect of the Ruff at different periods of the year, see Case **22** on the West side of the Hall. Attention may also be directed to the series of Ducks in Case **23**.

149. Three male Stag-beetles, with injuries caused by the mandibles of other males in fighting. ("Origin of Species," Chap. iv, Sexual Selection.)

150–156. A series of Birds in illustration of Darwin's observations on the plumage of the young in comparison with that of the adults. ("Descent of Man," Chap. xvi.)

150. House Sparrow, *Passer domesticus*. The adult male is more conspicuous than the adult female (note the dark throat), and the young in its first plumage resembles the female.

151. Bullfinch, *Pyrrhula europæa*. The adult male is more brilliant than the adult female, and the young resembles the female in dullness of coloration, but differs in the absence of black on the top of the head.

152. *Amydrus blythi*, a Starling of Sokotra. The adult male is less conspicuous than the adult female, and the young resembles the male.

153. Starling, *Sturnus vulgaris*. The adult male and female are alike, and the young has a first plumage peculiar to itself.

154. Kingfisher, *Alcedo ispida*. The adult male and female are brilliant and alike, and the young in its first plumage does not differ from the adults.

155. Red Bishop-bird, *Pyromelana oryx*. The adult male has a brilliant summer plumage, and in the winter is dull and resembles the adult female, which is the same in summer and winter; the young resemble the adults in their winter plumage.

156. *Oreopyra leucaspis*, a Humming-bird of Central America. The adult male differs in coloration from the adult female; the young male resembles the adult male, and the young female the adult female.

157. Specimens of the Elephant-fly, *Tabanus internus*, a fly which, by constantly harassing the Elephant and other large mammals, checks undue increase in their numbers. ("Origin of Species," Chap. xi.)

158. Specimens of the Screw-worm Fly, *Chrysomyia macellaria*. In Paraguay, where the fly is common, horses, cattle, and dogs are prevented from running wild and flourishing in a feral state by the fly laying its eggs in the navel of the new-born young, with usually fatal results when the maggots hatch out. ("Origin of Species," Chap. iii, Struggle for Existence.) As an illustration of the balance maintained in nature, Darwin suggests that if certain insectivorous birds were to decrease in Paraguay, the parasitic insects which probably attack the navel-frequenting fly would increase, and the fly itself would accordingly decrease. The resulting diminished mortality among the cattle would react on the vegetation, thereby influencing the number of herbivorous insects, and thus of insectivorous birds, "and so onwards in ever-increasing circles of complexity."

159. A copy of the diagram drawn up by Darwin to illustrate his views on the evolution of species. The intervals between the horizonal lines represent large units of time, *e.g.*, a thousand generations, and the letters A to L at the bottom of the diagram stand for the several species of a genus occurring at one time in a country. While some of the species suffer extinction in course of time, as does D before reaching the period represented by the third horizontal line

of the diagram; others, such as F, survive unchanged to the end of the whole period which the diagram is supposed to cover. Other species again, such as A and I, are continually branching out into divergent varieties, most of which become extinct; but others persist, and vary again, until at the end of the whole period (represented by the uppermost horizontal line of the diagram) there are eight different species derived from A, and six from I. For a detailed explanation of the diagram, the visitor is referred to "The Origin of Species," Chap. iv.

160–165. A series of blind animals, mostly cave-dwellers. In instituting a comparison between the blind cave-animals of North America and Europe, Darwin laid stress on the fact that in each case the cave-animals are closely related to the animals of the surrounding country. If the blind animals had been special creations adapted for cave-life generally, one would have expected a close similarity in the organisation and affinities of the animals in the New and Old World caves ("Origin of Species," Chap. v, Effects of Use and Disuse).

160. A Cave-rat, *Neotoma pennsylvanica*, from Virginia, U.S.A. The specimens that live in dark caves are blind, but on being brought gradually into increasing intensity of light they slowly acquire a visual perception of objects.

161. *Ctenomys fueginus*, a burrowing Rodent of South America which is frequently blind. Darwin accounts for the reduction in the efficiency of the eyes as due to disuse, aided perhaps by natural selection, for the eyes in subterranean passages are not only useless as organs of vision, but are disadvantageous, in consequence of their liability to inflammation. Other examples of burrowing animals many of them partially or totally blind, are shown in Case **2**.

162. *Proteus anguinus*, a blind Amphibian of the Caves of Carniola, Austria.

163. Two blind Cave Fishes from the United States, *Typhlichthys rosæ* and *Amblyopsis spelæus*.

164. *Cambarus pellucidus*, a blind Crayfish inhabiting the underground waters of the Mammoth Cave of Kentucky.

165. Several species of *Anophthalmus*, *Bathyscia* and other genera of blind Beetles found exclusively in caves.

166. A series of Dung-beetles, in which the tarsal or terminal joints of the front legs are wanting. In the beetles in the top row

the tarsi are wanting in both sexes ; in the other species exhibited they are absent in the male and very minute in the female. Darwin explains the phenomenon of loss or reduction of the tarsi as due, not to an inheritance of repeated mutilations, but to the effects of long-continued disuse ("Origin of Species," Chap. v, Effects of Use and Disuse). In connection with the disuse of organs in Insects may here be considered the flightless Beetles of Madeira and other islands (**225**, Case **12**), in which the wings have dwindled in size until the power of flight has been lost.

167. A graded series of Lizards of the family Scincidæ showing reduction in the limbs, an illustration of the generalisation that "natural selection will tend in the long run to reduce any part of the organisation as soon as it becomes, through changed habits, superfluous, without by any means causing some other parts to be largely developed to a corresponding degree." ("Origin of Species," Chap. v.)

168. The pelvis and hind limb bones and claws of a large Anaconda Snake, *Boa murina*, an example of vestigial structures. ("Origin of Species," Chap. xiv.)

169. (In the upper part of Case **6.**) A Bat, a Flying Squirrel, and a *Galeopithecus*. Darwin, in his reply to the contention that Bats could not have been evolved from a quadruped animal, because the wings in their early stages of evolution would present no advantage to the possessor, and would therefore not be perpetuated by natural selection, instances the Flying Squirrel and *Galeopithecus* as suggesting how, in the early stages of the evolution of Bats, the wings were but a parachute, a fold of skin extending between the fore and hind limbs on each side and between the fingers, and that the power of flapping this membrane was gradually evolved, and eventually the capacity for true flight. ("Origin of Species," Chap. vi.)

170. The fourth vertebra of the neck and the skeleton of the right fore foot of a Giraffe and an Ox, to show the great length of the bones in the former animal. The height of the Giraffe is instanced by Darwin in his reply to Mivart's contention that "natural selection is incompetent to account for the incipient stages of useful structures." Darwin argued that in times of dearth any slight superiority in height would enable a Giraffe to browse upon twigs inaccessible to others of shorter stature, and the taller animals would thus be more likely to survive and to perpetuate the small increment in height. ("Origin of Species," Chap. vii.)

171. (In Case **8**, a small black case on a table at the end of Bay VII.) A series of twelve specimens of Polyzoa to illustrate Darwin's observations on the avicularia and vibracula of these animals.

(The focussing of the microscope is effected by rotating the eye-piece; the slides are brought successively into the field of the microscope by rotating the milled wheel at the right-hand side of the case.)

A. *Fredericella sultana*, a fresh-water species, not uncommon in this country, shown to illustrate the appearance of a Polyzoon in the natural extended position. Each of the individuals of the colony possesses a circlet of tentacles, the cilia of which drive minute food-particles into the mouth, which is surrounded by the tentacles.

In the remaining slides (B—M), the animals are in their retracted condition. The tentacles (not visible in most cases) lie within the cavity of the "zoœcium," the term applied to the units or individual members of the colony. The series illustrates some of the modifications of the avicularia and vibracula, the evolution of which is discussed in Chap. vii of the "Origin of Species." There can be no reasonable doubt that an avicularium is to be regarded as a modified zoœcium, while a vibraculum is an avicularium whose lower, or movable, jaw has been prolonged into a bristle-like structure, the "seta."

B. Part of a colony of a species of *Bugula*, consisting of branches composed of elongated zoœcia arranged in three or four transverse rows. The numerous avicularia are readily recognised by their resemblance to birds' heads. The lower jaw, by means of which the avicularium can grasp a foreign object, corresponds with the lid or operculum of an ordinary zoœcium, with which the avicularium itself corresponds.

This specimen, which, like most of the other slides here shown, has been lent by the University Museum of Zoology, Cambridge, is of special interest in being one of the specimens collected by Darwin during the voyage of the *Beagle*. It may be surmised that Darwin refers to this species, or to one closely allied to it, in Chap. ix of the "Naturalist's Voyage round the World," where he says, "Perhaps the most singular part of their structure is, that when there were more than two rows of cells [zoœcia] on a branch, the central cells were furnished with these appendages [avicularia], of only one-fourth the size of the outside ones," a good illustration of the fact which has often been noted that the observations made during the *Beagle* voyage were the basis of Darwin's later work.

C and D. Fragments of other species of *Bugula*, showing similar avicularia. In D the retracted tentacles and the alimentary canals of the zoœcia are visible.

E. *Beania magellanica*, a species in which the zoœcia are not contiguous, each one bearing a pair of large avicularia near one end.

F. *Bugula reticulata*, an abyssal species in which the avicularia are borne on very long, flexible stalks, and are extremely variable in size in different parts of the same colony.

G–J. Species of *Bicellaria*, a genus allied to *Bugula*. In the species here shown the avicularia are developed to a remarkable extent, and are extremely variable in size.

G. *Bicellaria tuba*, showing the greatly elongated avicularia *in situ* and separated from the branch.

H. *Bicellaria moluccensis*. The muscles by which the lower jaw of the avicularium is closed are readily visible in this preparation. The zoœcia, which have lost their tentacles and internal organs, bear a cylindrical process giving rise to a series of finger-like spines.

J. *Bicellaria pectogemma*. The variation in the size of the avicularia is very striking.

K. *Flustra* (*Sarsiflustra*) *abyssicola*, an example of a species with an entirely different type of avicularium. The avicularia are completely in series with the rest of the units of the colony, but may be distinguished by their relatively gigantic operculum, more or less spoon-shaped, and corresponding with the lower jaw of the avicularia of *Bugula* and *Bicellaria*.

L. A species of *Caberea*, showing the thread-like "setæ" of the numerous vibracula. The "elegant little coralline" referred to by Darwin in Chap. ix of the "Naturalist's Voyage round the World" probably belonged to this genus, which is remarkable for the simultaneous movement of the vibracula of the living colony.

M. A species of *Selenaria*, in which the vibracula are larger and the minute teeth borne by the setæ are more obvious than in L.

172. (In the lower part of Case **9.**) Specimens of the pelvic and hind limb bones of the Greenland Right Whale, *Balœna mysticetus*, being three selected from a series of eleven described by Sir John Struthers in the "Journal of Anatomy and Physiology," 1881. An illustration of the generalisation that rudimentary (vestigial) parts are apt to be highly variable, the variability resulting apparently from their uselessness, natural selection having no power to check deviations in their structure. ("Origin of Species," Chap. v.)

173. (On the sloping back of the case, towards the left-hand end.) Shells of coral-inhabiting Barnacles of the genus *Pyrgoma*, in which the small valves that close the opening of the shell are unusually different in the different species. An illustration of the contention that unusually developed parts are highly variable. ("Origin of Species," Chap. v.) In the rock barnacles the valves of the shell differ extremely little even in distinct genera.

The large specimen on this tablet is figured in Darwin's "Monograph of the Cirripedia," Vol. ii, pl. 13, fig. 1a.

174. A graded series of eight males and one female of the Atlas Beetle, *Chalcosoma atlas*, showing the extreme variability of the secondary sexual characters of the male. The characters in question are the large size of the horns on the head and thorax, the length of the front legs, and the size of the body as a whole. ("Origin of Species," Chap. v; "Descent of Man," Chap. x.)

175. A graded series of nine males and one female of the Indian Stag-beetle, *Odontolabis cuvera*, showing the extreme variability of the secondary sexual characters of the male. The characters in question are the large size of the head and mandibles, and in a lesser degree the length of the front legs, and the size of the body as a whole. ("Origin of Species," Chap. v.)

176. *Mustela vison*, a North American Polecat, instanced by Darwin in reply to an objection that aquatic carnivores could not have been derived from terrestrial forms because the animals could not have existed in the transitional state. Darwin points out that *Mustela vison* has webbed feet and resembles an otter in its fur, short legs and the form of its tail. During the summer it preys on fish, and during the winter it lives like other polecats on mice and similar land animals. ("Origin of Species," Chap. vi.)

177–180. Specimens of *Saurophagus sulphuratus*, *Puffinuria urinatrix*, *Cinclus aquaticus* and *Colaptes campestris*. One of the great difficulties that Darwin had to contend with in the elaboration of his theory was the fact that the known cases of adaptive modifications in their early stages are extremely scarce. The four birds here shown are mentioned by him as instances in which the observed alteration of habits might in course of time result in a gradually improving adaptive modification of certain parts of the body. ("Origin of Species," Chap. vi.)

177. Tyrant Fly-catcher, *Saurophagus sulphuratus*, a bird of South America which at times hovers like a Kestrel, and at other times dashes into water like a Kingfisher.

178. *Puffinuria urinatrix*, a Petrel which in its habits of diving, swimming and flying resembles the Auks and Grebes rather than its own relatives.

179. Water-ouzel, *Cinclus aquaticus*, a bird allied to the Thrushes, yet differing markedly from them in its habit of diving in water.

180. *Colaptes campestris*, a Woodpecker, possessing the long straight beak, the usual arrangement of the toes, two forward and two backward, for grasping boughs of trees, and the stiff tail feathers to support the body against a tree trunk, yet living on the plains of La Plata where hardly a tree grows, and making its nest in holes in banks.

181. Swim-bladder of a Conger Eel and Lungs of a Monkey. The swim-bladder of Fishes and the lungs of the higher Vertebrates, occupy the same position in the body and are developed in the same manner, but the one serves for flotation and the other for respiration. Darwin points out how a change of function may have been brought about in an organ by *two* organs in the body subserving for a time the same function, which function is gradually transferred from the first or older organ to the newer, and ultimately confined to the newer. He instances the case of the Dipnoan fishes, animals which use the swim-bladder for respiratory purposes alternately with the gills, and thus indicate a transition to the higher Vertebrates in which functional gills do not occur, and the lung is the sole organ of breathing. ("Origin of Species," Chap. vi.)

182. Two embryos of the Fowl, incubated about four days, and an explanatory sketch, showing the transient gill-slits which point to descent from water-breathing ancestors. ("Origin of Species," Chap. vi.)

183. Dissections of eyes of three Cephalopods and a Vertebrate (Horse). In reply to Mivart, who instanced, as one of the difficulties in the way of acceptance of the theory of natural selection, the similarity of structure in the eyes of animals so remotely related as Cuttle-fishes and Vertebrates, Darwin pointed out that though there is a general resemblance between the eyes, there are very fundamental differences. ("Origin of Species," Chap. vi.)

The lens in the eye of the Cuttle-fish is a hardened secretion of the skin, whereas that of the Vertebrate eye is composed of cells of the skin which have coalesced and become transparent. The retina of the Cuttle's eye is directly transformed from the epidermal layer of the skin, whereas that of the Vertebrate eye is developed from

the brain as a hollow outgrowth, the outer part of which becomes inpushed and converted into a cup. Moreover, the manner in which the eye of *Sepia* (C) has probably been evolved from a simple, nearly-closed pit, such as occurs in *Nautilus* (A), is indicated in the condition found in *Ommastrephes* (B). In *Nautilus* there is no lens; in *Ommastrephes* a lens is present, but it is only partially covered over by a layer of skin; while in *Sepia* this layer is complete and transparent, and is known as the cornea.

184. *Sesarma mülleri* and *Ocypoda arenaria*, two crabs belonging to different but related families, and both adapted for living out of the water, although the arrangements for admitting air to the gill-chamber for the purpose of aerial respiration are different in the two cases. ("Origin of Species," Chap. vi.) In *Sesarma mülleri* the carapace can be raised behind so that a slit-like opening into the gill-chamber appears above the last pair of legs; in *Ocypoda arenaria* there is an opening, fringed with hairs, between the third and fourth pairs of legs on each side of the body. The conclusion to be drawn from these facts is that the capacity for breathing air has been acquired independently in the two crabs, the common ancestral form being capable of aquatic respiration only (Fritz Müller).

185. A small series of fruits and seeds as an illustration of Darwin's remark that the same end may be gained by the most diversified means. The end to be gained in the present instance is the conveyance of the seeds to a distance from the parent plant, and this is effected by a modification of the seed-coat or the carpel into a fluff (*e.g.* 1 and 2) or a membrane (*e.g.* 3), such as will enable the wind to carry the seeds to a distance before they reach the ground, or into hooks (*e.g.* 4, 5, and 6), which, by entanglement in the fur of passing animals, will result in the seeds being taken to a distance before they are dislodged. Or the carpels may, on drying, dehisce with such violence as to eject the seeds to a distance (*e.g.* 7 and 8), or they may become sticky when wet so as to cling to the bodies of passing animals (*e.g.* 9). Or the fruits may be of such a nature that, at all events, in a proportion of cases, the seeds are protected from the action of the digestive juices of animals which eat them (*e.g.* 10 and 11). ("Origin of Species," Chap. vi.) A much more extensive series of specimens illustrating the means of dispersal of fruits and seeds is exhibited in the Botanical Gallery.

186. A small series of Lamellibranch shells, selected to illustrate Darwin's remark on the diversity in the form of the hinge and its teeth; an example of the same purpose being served in different

ways in more or less closely related animals. ("Origin of Species," Chap. vi.)

187. Examples of Insects which escape falling a prey to birds and lizards by their resemblance to decayed leaves, twigs and spines. Darwin's reply to Mivart's contention that "as the minute incipient variations will be in *all directions*, they must tend to neutralise one another," is to the effect that, "assuming that an insect happened to resemble in some degree a dead twig or a decayed leaf, and that it varied slightly in many ways, then all the variations which rendered the insect at all more like any such object, and thus favoured its escape, would be preserved, whilst other variations would be neglected and ultimately lost; or, if they rendered the insect at all less like the imitated object, they would be eliminated." ("Origin of Species," Chap. vii, Miscellaneous Objections.) Numerous other instances of Protective Resemblance are shown in Cases **7, 14, 24,** and **25.**

188. Beak of Duck and "whale-bone." The baleen or "whale-bone" of Whales consists of a great number of laminæ or plates of a horny material, which fray out at the edge into bristles and form an efficient strainer. A piece of the baleen of the Humpbacked Whale, *Megaptera boops*, is shown on the floor of this case. In answer to Mivart's question, "How to obtain the beginning of such useful development," Darwin referred to the efficient straining apparatus of the beak of the Shoveller Duck, and pointed to the beak of the Common Duck as an illustration of the manner in which the evolution of such a useful apparatus may have begun. ("Origin of Species," Chap. vii.)

189. Common Cuckoo, *Cuculus canorus*, and a clutch of eggs, including a Cuckoo's egg, taken from the nest of a White-throat. The Cuckoo's eggs are small for the size of the bird; they are laid singly in strange nests, and the young Cuckoo, shortly after hatching, ejects its foster-brothers from the nest. Darwin explains at some length how the habits of the Cuckoo, at first probably casual, may have become regular and intensified by natural selection. ("Origin of Species," Chap. viii.)

190. Cow-bird, *Molothrus bonariensis*, an American bird related to the Starlings rather than to the Cuckoos, but having the habit of laying its eggs in the nests of other birds. It lays several eggs in the strange nest, and thus has not perfected its parasitic habit to the same degree as has the Cuckoo, or even its own relative, *Molothrus pecorus*, which lays but a single egg in the nest, and thus insures

abundance of food for its offspring. ("Origin of Species," Chap. viii.)

A large series of eggs of the Cuckoo and of *Molothrus* is shown on the West Side of the Main Staircase.

191. A series of nests of Hymenoptera, leading up to the exquisitely economical honey-comb of the Hive Bee, in which, for a given size of cell, the expenditure of wax in the manufacture of the walls is reduced to a minimum, the cells being not only hexagonal in section, with single walls dividing adjacent cells, but they are disposed back to back in two layers in such a way that the three pyramidal faces of the end of one cell are walls common to three adjacent cells of the other layer. ("Origin of Species," Chap. viii.) The examples shown are a nest of the Humble Bee and those of two species of *Polistes*, a piece of the honey-comb of the Hive Bee, and an enlarged model of four of the cells.

192. Examples of melanic and albino Mammals. Occasionally there occurs in individual cases an abrupt departure from the usual coloration of a species, the colour in these cases being either very intense or even black—melanic form, or else very pale or white—albino form. ("Origin of Species," Chap. ix.) Numerous examples of melanic and albino animals are shown in Cases **16** and **15.**

193. A small series of bones of the fore limb of Horse-like Ungulates showing how, by the loss of the fifth digit and the shortening of the second and fourth, a form like *Hyracotherium*, of the Eocene, may have given rise to one like *Hipparion*, of the Pliocene; and how, by a still further reduction of the second and fourth digits to slender splint-bones, the foot of the modern Horse may have been evolved. Darwin suggests that the Tapir, with four toes on the fore limb, though not a direct survival of the ancestor of the Horse, is not very different from the common ancestor of the Tapir and Horse. ("Origin of Species," Chap. x.) For a more extensive series of remains illustrating the ancestry of the Horse the visitor is referred to one of the middle cases in the North Hall. A series of remains illustrating in like manner the line of evolution of the Elephant is on view in the Geological Department.

194. *Nautilus*, an extremely ancient Cephalopod surviving to the present day almost unchanged in character. ("Origin of Species," Chap. xi.)

195. *Lingula*, an extremely ancient type of Brachiopod surviving to the present day almost unchanged in character. ("Origin of Species," Chap. xi.)

196. *Trigonia*, a Mesozoic genus which has escaped extinction. The existing species are confined to the Australian seas ; the range of the fossil forms is, with the exception of those found in the Tertiary rocks of Australia, from the Lias to the Cenomanian (Upper Cretaceous). ("Origin of Species," Chap. xi, Extinction.)

197. (In the lower part of the case.) Specimens of *Lepidosiren*, *Polypterus*, and *Lepidosteus*, solitary modern representatives of groups which flourished in past geological periods. Darwin speaks of these as "living fossils," surviving in fresh waters, where competition is less severe than elsewhere. (It is not clear whether by "*Lepidosiren*" Darwin was referring to the *Lepidosiren paradoxa* of South America or the *Protopterus annectens* of Africa, long known as *Lepidosiren annectens ;* both are therefore shown.) *Ornithorhynchus*, the Duck-bill Platypus, is another example of Darwin's "living fossils." ("Origin of Species," Chaps. iv and xi.)

198. The Tuatara of New Zealand, *Sphenodon punctatus*, as an illustration of the imperfection of the geological record. No remains of members of the family Sphenodontidæ are found later than the Jurassic period, yet *Sphenodon* is living at the present day.

199. Cast of *Archæopteryx macrura*, from the Lithographic Stone (Lower Kimmeridgian) of Eichstädt, Bavaria, as an illustration of the imperfection of the geological record. *Archæopteryx* was not known at the time the first edition of the "Origin of Species" appeared ; in the later editions Darwin observes (Chap. x) that "not long ago palæontologists maintained that the whole class of birds came suddenly into existence during the Eocene period," and remarks that the wide interval between birds and reptiles has now been partially bridged over in the most unexpected manner (Chap. xi).

Particularly impressive as an illustration of the imperfection of the geological record is the fact that the Solenhofen quarries have been worked for some two hundred years, and yet only two specimens of *Archæopteryx* have been discovered, one described in 1862 and the other in 1884. The actual specimen of which the cast is here shown is in the Geological Department of the Museum ; the later discovered specimen is in the Berlin Museum.

200. A small series of Trilobites ; an example of a group of animals becoming abruptly extinct at the close of the Palæozoic period. ("Origin of Species," Chap. xi.)

201. A small series of Ammonites ; an example of a group of animals becoming abruptly extinct at the close of the Mesozoic period. ("Origin of Species," Chap. xi.)

202. A blood-sucking Bat or Vampire, *Desmodus rotundus*, one of the animals which determine the existence of the larger naturalised quadrupeds in several parts of South America. ("Origin of Species," Chap. xi, Extinction.)

203. Some remains of the great extinct Armadillo, *Glyptodon*, of the Pleistocene of South America, for comparison with the exoskeleton of the recent Peba Armadillo; an illustration of the succession of the same types of animal in the same areas. ("Origin of Species," Chap. xi.) In his autobiography Darwin mentions that during the voyage of the *Beagle* he had been deeply impressed by discovering in the Pampas formation great fossil animals covered with armour like that on the existing Armadillos. He could only explain the facts on the supposition that species gradually became modified, and it was this supposition, supported by numerous other items of evidence accumulated on the voyage, which gradually ripened into his theory of the evolution of species by natural selection. ("Life and Letters," Vol. i, p. 82.)

204. Photograph of the fire-screen made from the feathers of the Argus Pheasant referred to by Darwin in "Descent of Man," Ed. 2, p. 441. Lent by the University Museum of Zoology, Cambridge. (See observations on specimen **129**.)

205. (In Case **12**, Bay IX.) Specimens of *Porcellio scaber* from New Zealand. *Porcellio scaber* is a Woodlouse extremely common in Britain, and of wide distribution. In New Zealand it is especially abundant around buildings and in greenhouses, but is rarely met with in the native bush. The evidence points to the conclusion that the species has been introduced into New Zealand by the agency of man. ("Origin of Species," Chap. xi.)

206. *Cancer novæ-zealandiæ*, a crab of New Zealand, closely related to the edible crab of Britain, in illustration of the remark of Dana's quoted by Darwin ("Origin of Species," Chap. xii) :—"It is certainly a wonderful fact that New Zealand should have a closer resemblance in its Crustacea to Great Britain, its antipode, than to any other part of the world." The remark refers particularly to the genera *Cancer* and *Portunus*.

207–212. Ocean-borne seeds collected in various parts of the world, as examples of one of the natural methods by which the flora of an oceanic island becomes established. ("Origin of Species," Chap. xii, Means of Dispersal.)

207. Drift seeds collected by Dr. Guppy on the beach of the Solomon Islands, in the Western Pacific.

208. Drift seeds collected on the beach of the Caroline Islands, in the Western Pacific.

209. Drift seeds collected on the beach of the Admiralty Islands, New Guinea, during the *Challenger* Expedition.

210. Four kinds of seeds picked up on the beach of Cocos Island, and presented by Dr. F. Wood-Jones, 1909. There are no plants on the island producing seeds like these. Seeds similar to these and picked up at the same time have been germinated artificially, and the explanation why the plants have not yet established themselves on the island is that the seeds are not thrown sufficiently high up the beach to find soil for germination.

211. Two kinds of seeds picked up on the beach of Cocos Island, and presented by Dr. F. Wood-Jones, 1909. These are seeds of plants which grow on the island, and it is thus uncertain whether they are drifted specimens or not. The seeds by which the species were originally introduced were evidently sea-borne from a distance.

212. Molucca Beans (*Entada sp.*), seeds of a purely tropical plant picked up on the British Coast. The single specimen in the upper box was found on the Cornish Coast near the Lizard, the other four were collected on the Orkney Islands. They were probably brought from Tropical America by the Gulf Stream.

213. Figure of the foot of a Red-legged Partridge (*Caccabis rufa*), with a clod of dry earth adhering. (Proc. Zool. Soc., 1863.) After the earth had been kept for three years, Darwin broke it up and watered it, and obtained no less than 82 young plants from the seeds contained. He points out how seeds in such accumulations of mud and earth may be carried from one country to another by birds in the course of their migrations. ("Origin of Species," Chap. xii.)

214. Hooked fruits of *Acæna elongata.* Darwin writes :—"In certain islands not tenanted by a single mammal, some of the endemic plants have beautifully hooked seeds ; yet few relations are more manifest than that hooks serve for the transportal of seeds in the wool or fur of quadrupeds. But a hooked seed might be carried to an island by other means ; and the plant then becoming modified would form an endemic species, still retaining its hooks." ("Origin of Species," Chap. xiii.) In this connection the seeds (or, more correctly, the fruits) of the rosaceous plant *Acæna* are interesting as having frequently been found adhering to the feathers of the Albatross, which may thus be a means of introducing the plant into oceanic islands.

215. Seeds taken from the crop of Pigeons (a) in the Admiralty Islands, and (b) in the Solomon Islands. The crop is a part of the alimentary tract in the lower region of the neck of a bird in which food is stored until it is passed on to the gizzard. No digestion takes place in the crop, and seeds may be stored in it unchanged for many hours, during which the bird may fly or be blown in a gale from a continent to a distant island. The accidental death of the bird on arrival might well lead to the seeds germinating and thus establishing on the island plants previously unknown there. ("Origin of Species," Chap. xii, Means of Dispersal.)

216. (On the shelf in the lower part of the case.) A Double Coco-nut or Coco-de-mer, *Lodoicea seychellarum*. Double Coco-nuts are well known in consequence of their being brought home by sailors as curiosities. They are found floating in all parts of the Indian ocean, but the plant itself lives only in the Seychelles Islands. The floating nuts were known to travellers long before the Seychelles were discovered. Recent examination of floating specimens shows them to be hollow, and incapable of germination, so that as an example of the spread of plants by means of the sea the case is not a good one. On the other hand the Coco-nut, *Cocos nucifera*, is equally common, or more so, on the surface of the ocean, and those cast up on distant islands germinate readily.

217. Two ice-borne stones (erratics) from the Boulder Clay of Norfolk. Darwin comments on the fact that since icebergs can carry stones and deposit them at a distance, it is at least possible that they may carry also seeds of plants from a mainland and leave them on some distant island in a condition still capable of germination. ("Origin of Species," Chap. xii.)

218. Dragon-flies of three species, caught at Cocos Island and presented by Dr. F. Wood-Jones, 1909. At certain times of the year, generally after a North wind, dragon-flies are very numerous on the atoll. Yet none of them have been bred on the island; all are immigrants from some mainland, the nearest of which is several hundred miles away. Dragon-flies cannot breed on the island because there are no open tracts of fresh water in which the larval stages of the life-history may be passed.

219. A Locust, *Acridium peregrinum*, one of the locusts mentioned by Darwin as swarming over the island of Madeira in 1844. ("Origin of Species," Chap. xii, Means of Dispersal.) The importance of such visits, Darwin points out, lies not only in the devastation

of the herbage, but in the introduction of new kinds of plants arising from undigested seeds dropped on the island by the locusts.

220. A Locust, *Acridium peregrinum*, one of the swarm that visited Las Palmas, Grand Canary, in 1908. Fifty tons were killed and paid for by weight, and it was estimated that this constituted only one-fourth of the swarm. Allowing 15 specimens to the ounce, there would be about 107,500,000 specimens in the total of 200 tons.

221. *Dytiscus* and *Colymbetes*, water-beetles such as might be instrumental in the conveyance of fresh-water molluscs to distant islands. Darwin speaks of *Dytiscus* caught with the Fresh-water Limpet, *Ancylus*, adhering to it, and he records the capture of a *Colymbetes* on the *Beagle* at a distance of forty-five miles from the nearest land. ("Origin of Species," Chap. xiii, Fresh-water Productions.)

222. Shells of the Fresh-water Limpet, *Ancylus fluviatilis*. Darwin mentions the possibility of the spread of this and other fresh-water molluscs by their adhering to water-beetles and ducks, which may fly across the sea to distant parts. ("Origin of Species," Chap. xiii.)

223. Shells of three species of *Cyclostoma*, land molluscs with an operculum or lid which so effectually closes the mouth of the shell that the animal is not injured by immersion in sea-water. Entangled in drift-wood, the animals may float to distant parts, and may establish themselves on any island upon which they may be cast up. ("Origin of Species," Chap. xiii.)

224. Shells of the Garden Snail, *Helix aspersa*, and the Edible Snail, *Helix pomatia*. These molluscs, though not provided with an operculum, close the mouth of the shell at certain times of the year by an epiphragm, a secretion which hardens in contact with air. Darwin ascertained by experiment that the Edible Snail, when thus sealed, was uninjured by immersion in sea-water for twenty days. ("Origin of Species," Chap. xiii.)

225. A selected series of flightless Beetles from Madeira. Darwin accounts for the occurrence of flightless beetles on oceanic islands as due to natural selection combined probably with disuse of the wings. The individual insects which use their wings to any great extent will be liable to be blown off the island and destroyed at sea, whereas those which, through indolence or through the wings being less perfectly developed, venture less in the air will remain on the island

and perpetuate the deficient mechanism of flight. ("Origin of Species," Chap. v, Effects of Use and Disuse.)

In some island beetles, *e.g.*, *Blaps gages*, in the top row, the wing-covers are fused together. ("Origin of Species," Chap. xiii, Inhabitants of Oceanic Islands.)

226. Specimens of *Mellissius eudoxus*, of St. Helena, a Beetle of interest in being an apterous species of the family Dynastidæ, the other members of which are winged.

227. Four species of Beetles of the sub-family Ectennorhinides, which includes numerous flightless beetles found in oceanic islands, and a single continental form, *Brachyxystus subsignatus*, which is winged.

228. A series of endemic land shells of Madeira, in illustration of Darwin's remark that "Madeira is inhabited by a wonderful number of peculiar land shells, whereas not one species of sea shell is peculiar to its shores." ("Origin of Species," Chap. xiii.)

229. Five species of Bats from Oceanic Islands. Darwin notes that although terrestrial mammals do not occur on oceanic islands, bats are found, and in many instances they are peculiar to an island or a group of islands. The explanation is that the ancestors of the island bats were stragglers from the mainland, carried probably during a gale, and that their descendants have gradually assumed their present distinctive characters in relation to their surroundings. ("Origin of Species," Chap. xiii.) Of the specimens shown, *Pteropus rubricollis* and *Pteropus vulgaris* are endemic in Mauritius and Bourbon, *Pteropus psilaphon* occurs only in the Bonin Islands, *Pteropus keraudreni insularis* is peculiar to the Caroline Islands, and *Notopteris macdonaldi* to the Viti Archipelago.

230. A series of Black Grosbeaks peculiar to the Galapagos Islands, and first discovered by Darwin during the voyage of the *Beagle*. Darwin noted that in several cases different species inhabited different islands of the archipelago, and he further remarked that the nearest relatives of these birds are to be found on the mainland, which one would hardly expect to be the case had the endemic species of the islands been special creations instead of modified descendants of birds which had immigrated from the mainland. ("Origin of Species," Chap. xiii.) In his autobiography Darwin states that it was the peculiarity of the Galapagos fauna, among other things, that first influenced him to question the immutability of species, and started a train of thought which found

expression in the "Origin of Species" some twenty-four years later.

231. A series of Frogs and Tree-frogs from Madeira, the Azores, Mauritius and New Caledonia. ("Origin of Species," Chap. xiii, Absence of Batrachians on Oceanic Islands.) The statement that "frogs have been introduced [*i.e.* by man] into Madeira, the Azores, and Mauritius, and have multiplied so as to become a nuisance" does not, except in the case of the Azores, appear to be supported by evidence. The *Rana esculenta* found in Madeira is a widely-distributed frog of Europe, Asia, and North Africa, and the variety of Tree-frog found in Madeira (*Hyla arborea meridionalis*) is a form common in N.W. Africa. Frogs introduced into the island by man would be more likely to have been brought in by the Portuguese than by the Moors, and one would therefore expect rather a Portuguese variety of Tree-frog than the African. The same Tree-frog also occurs in the Canary Isles. The Frog of Mauritius (*Rana mascariensis*) occurs also in Madagascar, the Seychelles, and other islands, and there is no evidence of its introduction by human agency. On the other hand the Tree-frog of New Caledonia has been definitely ascertained by Layard to have been brought in from Australia.

232. *Galaxias attenuatus*, quoted by Darwin as an important case of a fish occurring in the fresh waters of parts of the world as widely remote as Tasmania, New Zealand, Falkland Islands, and the mainland of South America. ("Origin of Species," Chap. xiii, Geographical Distribution, Fresh-water Productions.) Recent study of the family Galaxiidæ has shown that, as in the case of the Salmonidæ, the fishes are marine fishes of which some have adopted a purely fresh-water habit. *Galaxias attenuatus*, however, although found in brackish and fresh water, breeds in the sea, and its wide distribution is therefore less remarkable than was formerly supposed.

233. A small series of Alpine plants in illustration of Darwin's remark on the similarity of the mountain plants of distant parts of the world, and the absence of such plants from the vast tracts of low ground between. ("Origin of Species," Chap. xii.) *Saxifraga nivalis* and *Saxifraga rivularis* occur on the mountains of Europe, Asia and America, *Gentiana verna* on the mountains of Europe and Asia, and *Gentiana nivalis* on those of Europe and America; yet, except in arctic regions, these plants do not grow below two or three thousand feet above the sea level.

234. Bones of the feet of the Roebuck, Fallow Deer and Ox,

illustrating the generalisation that vestigial structures, probably useless to the possessor, are of value as indicating affinity with animals in which the parts are well developed. The bones of the second and fifth digits are wanting in the Ox; in the Roebuck and Fallow Deer they are present as vestiges, and these vestiges serve to show the affinity that exists between the ruminants and the "pachyderms." ("Origin of Species," Chap. xiv.)

235. Lower jaws of various Marsupials, showing the inflection of the angle, which, prevailing as it does throughout many and different species which have very different habits of life, is valuable evidence of descent from a common ancestor. ("Origin of Species," Chap. xiv, Classification.)

236. Skulls of the Viscacha and *Phascolomys*, showing general resemblance. These animals are cited by Darwin ("Origin of Species," Chap. xiv) in illustration of G. R. Waterhouse's generalisation that when an animal of one group exhibits affinity with another group, the resemblances are general and not special. The Viscacha, for instance, resembles no Marsupial in particular, but Marsupials generally, and the conclusion to be drawn is that the Viscacha has departed from the ancestral form common to the Rodents and Marsupials to a less extent than have other Rodents. Similarly with regard to the Marsupial *Phascolomys*, the Wombat, in its relation with the Rodents. Darwin observes, however, that "it may be strongly suspected that the resemblance is only analogical, owing to the *Phascolomys* having become adapted to habits like those of a Rodent."

237. Electrical Organs in Fishes. Darwin mentions the occurrence of electrical organs in fishes as one of the difficulties in the way of accepting his theory, because the fishes possessing them are not near relatives; because the electrical organs occur in different parts of the body, and differ in the arrangement of the plates, and in the nerve supply; and because it is difficult to see by what graduated steps these organs have been developed in each separate group of fishes, the organ being of no utility for defensive or offensive purposes until fully formed. ("Origin of Species," Chap. vi.) The specimens shown are the Electric Cat-fish, *Malopterurus electricus*; Electric Eel, *Gymnotus electricus*; Electric Ray, *Torpedo hebetans*; and Skate, *Raia batis*.

238. Examples of Insects of two related families of Hymenoptera to show that organs that are constant in form in one family may be of diverse forms in another. ("Origin of Species," Chap. xiv.) In

the upper specimens, of the family Ichneumonidæ, the antennæ are constant in structure, being long and whip-like. In the lower specimens, of the family Tenthredinidæ, the antennæ differ much, and the differences are of subordinate value in classification.

239. Examples of closely allied Insects differing more in their larval than in their mature stages—three species of Shark Moth (*Cucullia*), and two species of Dagger Moth (*Acronycta*), with the caterpillars of each. ("Origin of Species," Chap. xiv.)

240. A Leptalid Butterfly, *Moschnoneura methymna*, bearing a mimetic resemblance to an Ithomiine Butterfly, *Scada phyllodoce*. Both occur in the same parts of South America. The two Butterflies are not closely related, a detailed comparison showing that the resemblance is one of shape and colour mainly. The mimicking Butterfly (*Moschnoneura methymna*) differs considerably in appearance from its relatives, a typical example of which, *Pseudopieris nehemia*, is here shown for comparison. The Ithomia is distasteful to predaceous birds, and the Leptalis is supposed to enjoy a freedom from persecution by its resemblance to the Ithomia. The case is instanced by Darwin as one in which "close external resemblance does not depend on adaptation to similar habits of life, but has been gained for the sake of protection." ("Origin of Species," Chap. xiv, Analogical Resemblances.) Numerous other instances of such protective resemblance are shown in Case **7**.

241. A series of Wasps and Bees, insects that are avoided because of their stings, mimicked by Flies, Moths, Beetles and Neuropterous insects not provided with such weapons. ("Origin of Species," Chap. xiv.) Of particular interest are the two Beetles in the top row, the hinder patches of orange and black being situated on the abdomen in *Hesthesis*, and on the elytra in *Tragocerus*. Other instances are shown in Case **7**.

242. Boring Molluscs, showing similarity of external form. The specimens to the right (*Petricola pholadiformis* and *Coralliophaga coralliophaga*) are closely related molluscs which resemble respectively the genera *Pholas* and *Lithodomus* (specimens to the left), although they are not related to these genera, and although there is no close affinity between *Pholas* and *Lithodomus*. ("Origin of Species," Chap. xiv.)

243. A Mouse, a Shrew and an *Antechinus*, belonging respectively to the Rodentia, Insectivora and Marsupialia, as examples of unrelated animals having the same general appearance. The resemblance is attributed to adaptation for similarly active move-

ments through thickets and herbage, and concealment from enemies. ("Origin of Species," Chap. xiv, Analogical Resemblances.)

244. Skulls of Dog and Thylacine, animals belonging to the Carnivora and Marsupialia respectively, to show the general resemblance in the teeth, attributable to the carnivorous habits of the two animals. The resemblance is a general one only; a detailed comparison of the teeth shows important differences. ("Origin of Species," Chap. xiv, Analogical Resemblances.)

245. Diagrams of the Skeleton of the Fore Limb of Reptiles, Birds, and Mammals, showing that however different the habits of life of these animals, the fundamental type of construction of the limb-skeleton is the same in all. ("Origin of Species," Chap. xiv.) The humerus is coloured blue, the radius and ulna red, the carpal bones green, and the metacarpal bones and the phalanges yellow. Equivalent digits are denoted by similar numerals. Actual specimens of these limbs are to be seen in the cases on the opposite side of the Hall. "How inexplicable is the similar pattern of the hand of a man, the foot of a dog, the wing of a bat, the flipper of a seal, on the doctrine of independent acts of creation! How simply explained on the principle of the natural selection of successive slight variations in the diverging descendants from a single progenitor!" ("Animals and Plants under Domestication," Chap. i.)

246. Preparations of the mouth-parts of a Beetle, a Sphinx Moth and a Bee, with diagrammatic sketches, to show how remarkably different in size and shape are the organs for sucking and biting which have been formed by modification of the mandibles and two pairs of maxillæ. ("Origin of Species," Chap. xiv, Morphology.)

247. The wild Chrysanthemum of China, *Pyrethrum sinense*. This is the wild plant from which all the cultivated varieties known as "Chrysanthemums" have by assiduous cultivation and artificial selection been derived. ("Animals and Plants under Domestication," Chap. xi.)

248. Primrose and Purple Loosestrife. The flowers of the Primrose are of two kinds, one with high stigma and low anthers, and the other with low stigma and high anthers. Darwin, by a series of experiments, found that better seed is produced by pollinating a high stigma flower with pollen from high anthers, and a low stigma with pollen from low anthers, than is produced by pollinating a stigma from anthers at a different level to itself. (Journ. Linn. Soc. 1862.) Darwin also discovered that in the Loosestrife

(*Lythrum*) the stigma and anthers occur at three levels in different flowers. (Journ. Linn. Soc. 1864.) See also specimens in Case **19.**

249. (In the lower part of the left-hand half of the case.) A Sea Iguana, *Amblyrhynchus cristatus*, a lizard of the Galapagos Archipelago, which lives partly on the sea shore and partly in the sea. It is sluggish in its movements, and feeds on sea-weed. ("Naturalist's Voyage round the World," Chap. xvii.)

250. A hybrid between the Common Pheasant, *Phasianus colchicus*, and the Ring-necked Pheasant, *Phasianus torquatus*. This hybrid is cited by Darwin as one of the few hybrids that are fertile. ("Origin of Species," Chap. ix, Degrees of Sterility.) Many other examples of Pheasant hybrids are shown in the North Hall.

251. A female Pheasant, *Phasianus colchicus*, partly albino, assuming male plumage. Presented by H.R.H. the Prince of Wales, 1909. Cases of female birds exhibiting male characters, such as long tail-feathers, hackles, comb, spurs, voice, and pugnacity, are instanced by Darwin in "The Descent of Man," Chap. viii. In most cases the phenomenon is associated with old age, or with disease of, or injury to the generative organs.

SPECIMENS ILLUSTRATING DARWIN'S RESEARCHES ON PLANTS.

In Case **19**, a table-case near the Owen statue, is exhibited a series of models, drawings and specimens illustrating the Fertilisation of Flowers. Instances are given of flowers cross-pollinated by the wind, and by insects; flowers in which self-pollination is impossible because the anthers and stigma of the same flower ripen at different times; flowers in which there are differences in the height of the anthers and stigma in different flowers of the same species, as *Primula* and *Lythrum*; and flowers in which cross pollination by insects is favoured by special floral mechanisms, as the Sage and Orchids. The modern development of the study of this subject was initiated by Darwin's investigations, published in "The Various Contrivances by which Orchids are fertilised by Insects," 1862, and "The Effects of Cross and Self Fertilisation in the Vegetable Kingdom," 1876.

In Case **20**, a table-case near the last, is exhibited a series of models, drawings and specimens of Insectivorous Plants, such as the Bladderwort, Pitcher Plant, Butterwort, Sundew and Venus' Fly-trap. Darwin's book, "Insectivorous Plants," 1875, contains the first detailed account of the remarkable method of nutrition characteristic of these plants. A copy of the book is shown in Case **3.**

Charles Darwin's Notebooks, 1836–1844

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Darwin's notebooks provide an invaluable record of his scientific thinking and, most importantly, the development of his theory of natural selection. This edition of the notebooks, prepared to the highest modern standards of textual editing, thus affords a unified view of Darwin's professional interests.

The *Red Notebook*, used on the voyage of H.M.S. *Beagle* and afterwards in England, contains Darwin's first evolutionary statements. In July of 1837, Darwin began his 'Transmutation Notebooks' (B–E) devoted to the solution of the species problem, and in the third notebook of this series he first formulated the theory of natural selection. To this can now be added another species notebook reconstructed from loose sheets; this 'Torn-Apart Notebook' represents the fifth Transmutation Notebook.

This volume also contains Notebook A on geology, Notebooks M and N on man and behaviour, and other notebook and manuscript materials from the period 1836–1844.

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Darwin's notes on *Beagle* plants
Ed. Duncan Porter

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